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VERTICAL PROFILES OF TEMPERATURE, SALINITY AND DENSITY FROM THE--ETC(U)
APR 79 R A KNOX, M J MCPHADEN

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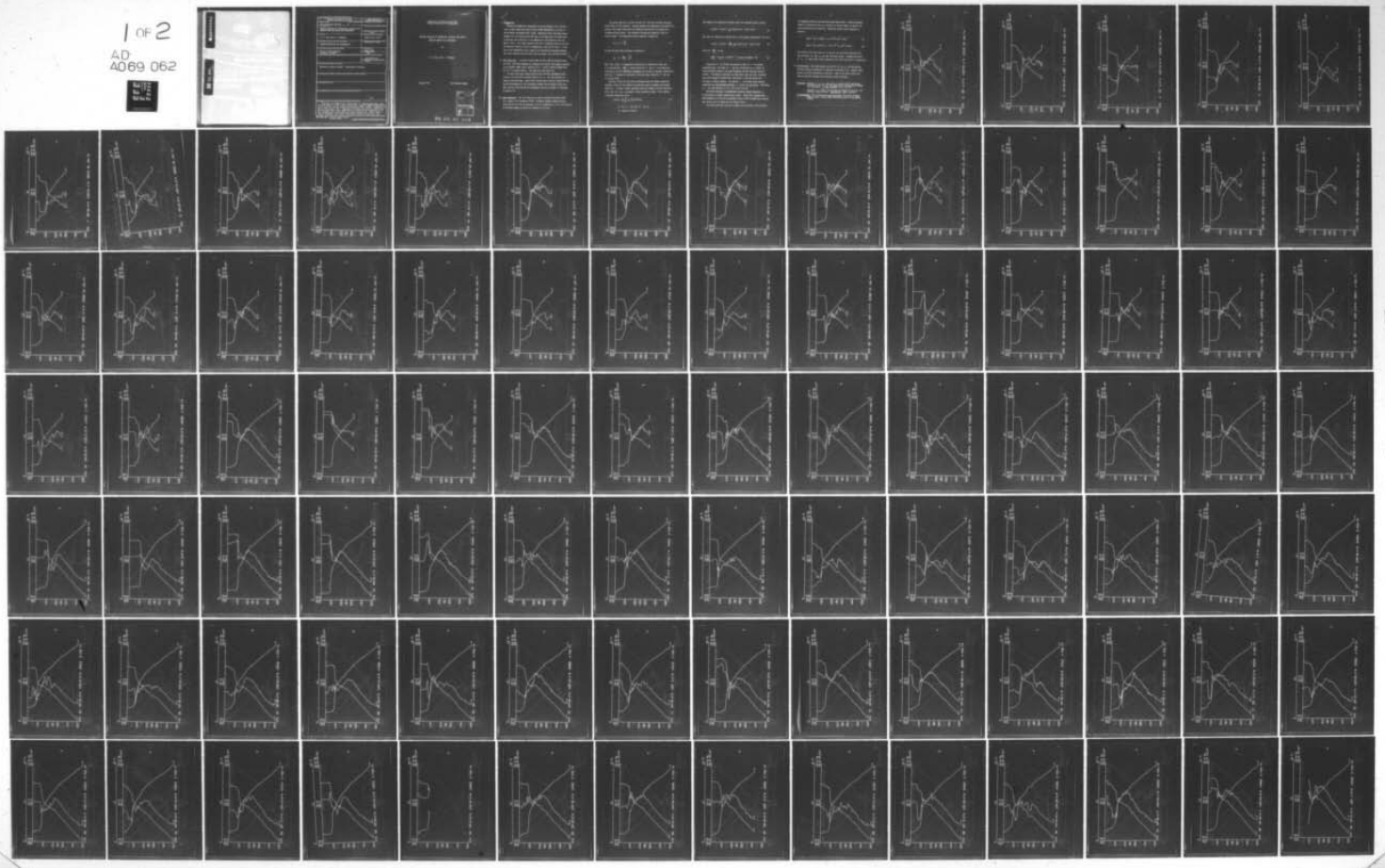

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

During the NORPAX Pole experiment of January-February 1974, 165 STD casts to 500 m depth were made from R/V THOMAS WASHINGTON in an area of 100 km radius surrounding 35°N, 155°W. Temperature data from these casts, together with ship and aircraft XBT data in the same area, have been used to describe the variability of the temperature field (Barnett, Knox and Weller, 1977.) This report presents the final, corrected values of salinity and...

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University of California, San Diego
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VERTICAL PROFILES OF TEMPERATURE, SALINITY AND DENSITY FROM THE NORPAX POLE EXPERIMENT

by

R. A. Knox and M. J. McPhaden

January 1979

SIO Reference Number

I. Introduction

During the NORPAX Pole experiment of January-February 1974, 165 STD casts to 500 m depth were made from R/V THOMAS WASHINGTON in an area of 100 km radius surrounding 35°N, 155°W. Temperature data from these casts, together with ship and aircraft XBT data in the same area, have been used to describe the variability of the temperature field (Barnett, Knox and Weller, 1977). This report presents the final, corrected values of salinity and potential density, as well as temperature, from the SDT casts. In the case of the temperature field, there is no significant difference between the values reported here and those used by Barnett, Knox and Weller (1977).

II. Data Collection. A standard Plessey 9006 STD with 1500 db pressure sensor was used. Data were recorded on a Plessey 8114 digital data logger, operated at the fastest sample rate, nominally 0.2 s. Typical lowering speeds were 0.5 m s^{-1} at greater depths. Only down-cast data were used.

On every third cast, Nansen bottles with reversing thermometers were placed on the STD wire at nominal depths of 0, 20, 100, 300 and 500 m to obtain calibration data. Apart from a few periods of obvious system failure, the STD performed well; the differences between STD and Nansen values were small and were well-defined and repeatable functions of depth, as discussed in section III.

III. Data Processing. The first step was to remove occasional bad data points via a simple first difference filter. Allowable changes between adjacent scans were set at 5 db for pressure, 0.4°C for temperature, 0.3°/$_{oo}$ for salinity. A negligible number of points was rejected in this way.

The second step was to correct the data for "salinity spiking", the well-known effect of time constant mismatch between the temperature and conductivity sensors, the signals from which are combined electronically to produce the recorded salinity signal. The procedure followed was essentially that of Scarlet (1975). The temperature sensor response is modeled as

$$T_R = T_I + \tau \frac{\partial T_I}{\partial t} \tag{1}$$

and the salinity sensor response is modeled as

$$S_R = S_I + \left(\frac{\partial S}{\partial T}\right)_c \tau \frac{\partial T_I}{\partial t} . \tag{2}$$

Here $T(t)$ $(S(t))$ is temperature (salinity) as a function of time, and τ is a time constant. $\left(\frac{\partial S}{\partial T}\right)_c$, a given function of T and S, is an empirical relationship for the temperature dependence of salinity at constant conductivity. Subscript I denotes an indicated or recorded value, subscript R the real or in situ value.

Casting (1) and (2) into finite difference form for digital processing requires a choice of the length of record over which to compute the gradient quantities. A greater length suppresses noise but reduces vertical resolution. After some trial runs, we adopted a simple smoothing scheme. First, define a smoothed temperature value:

$$\bar{T}_I(n\Delta t) = \frac{1}{16} \sum_{k=1}^{5} a_k \, T_I[(n-3+k)\Delta t] \tag{3}$$

$$a_1 = a_5 = 1, \quad a_2 = a_4 = 4, \quad a_3 = 6$$

Δt = sampling interval .

Then compute the temperature gradient using this smoothed series, so that

$$T_R(n\Delta t) = T_I(n\Delta t) + \frac{\tau}{2\Delta t}\{\bar{T}_I[(n+1)\Delta t] - \bar{T}_I[(n-1)\Delta t]\}. \quad (4)$$

Note that the smoothing is applied only in the gradient computation. Similarly:

$$S_R(n\Delta t) = S_I(n\Delta t) + \left(\frac{\partial S}{\partial T}\right)_c \frac{\tau}{2\Delta t}\{\bar{T}_I[(n+1)\Delta t] - \bar{T}_I[(n-1)\Delta t]\} \quad (5)$$

where for $\left(\frac{\partial S}{\partial T}\right)_c$ we use

$$\left(\frac{\partial S}{\partial T}\right)_c = S_I(n\Delta t)\{-0.033°C^{-1} + [T_I(n\Delta t)][0.00045°C^{-2}]\}. \quad (6)$$

Equations (4) - (6) define the gradient correction or "de-spiking" processing used. The value of τ was set, following Scarlet (1975), by trying different values to see which produced the best resultant density profile. True density inversions are both small scale and rare; therefore those which appear to extend over a few meters in the STD records are artifacts of sensor mismatch. We adjusted τ to minimize these apparent inversions in a few selected profiles; τ = 0.35 s was the result. This value of τ was then applied via (4) - (6) to all profiles.

The third step was a straightforward pressure (depth) averaging in 2.5 db blocks, to reduce random noise further. These block averages were then smoothed by a 1/4:1/2:1/4 weighted 3-point filter to yield the corrected data series prior to comparison with Nansen values.

The fourth and final step was to adjust this de-spiked, block-averaged,

and smoothed series to coincide with Nansen bottle data. Finding no marked change in calibration error as a function of station number, we applied the same corrections to all profiles. These were simple linear functions of pressure

$$T_f(n) = T(n) - 0.020°C + (4 \times 10^{-5} °C\ db^{-1})\ (P(n)) \qquad (7)$$

$$S_f(n) = S(n) + 0.015°/_{oo} + (6 \times 10^{-5}\ °/_{oo}\ db^{-1})\ (P(n)). \qquad (8)$$

The fields on the right sides of (7) and (8) are the series resulting from step #3 above; T_f and S_f are the final data values. Standard deviations of T_f, S_f about these linear regressions are 0.02°C and 0.01°/$_{oo}$ respectively.

IV. Profile Plots. Each page presents one profile of S_f, T_f, and the derived potential density (labeled D) as functions of pressure in db. Station information is given at the margin of the plot. Time is the time at which the lowering started; the down cast typically lasted 15 minutes.

References Barnett, T. P., R. A. Knox and R. A. Weller (1977) Space/time structure of the near surface temperature field during the NORPAX Pole experiment. J. Phys. Oceanogr., 7(4), 572-579.

Scarlet, R. I. (1975) A data processing method for salinity, temperature, depth profiles. Deep-Sea Res., 22(7), 509-515.

Acknowledgement. This investigation was sponsored by the Office of Naval Research under contract N00014-69-A-0200 as part of the NORPAX program.

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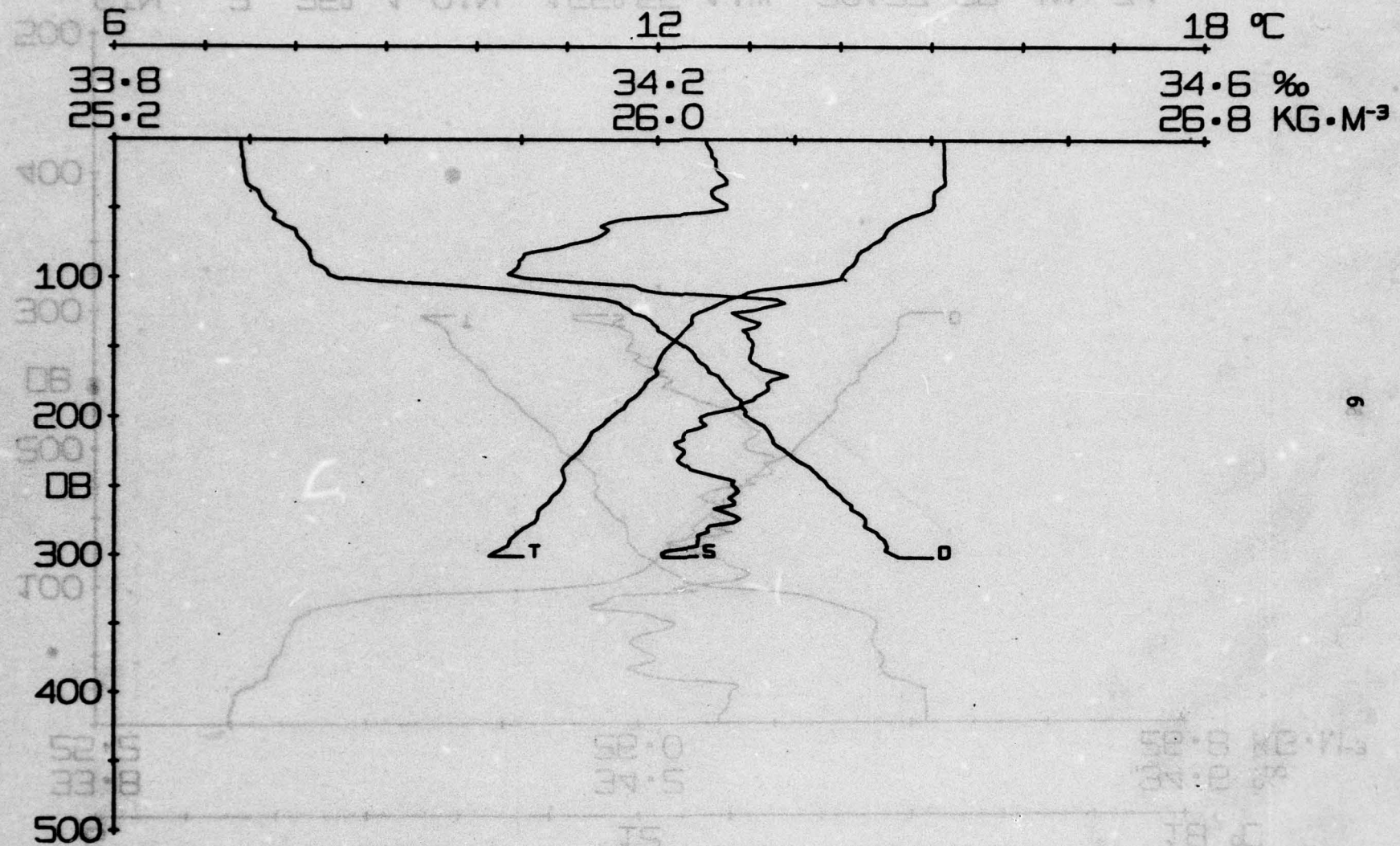

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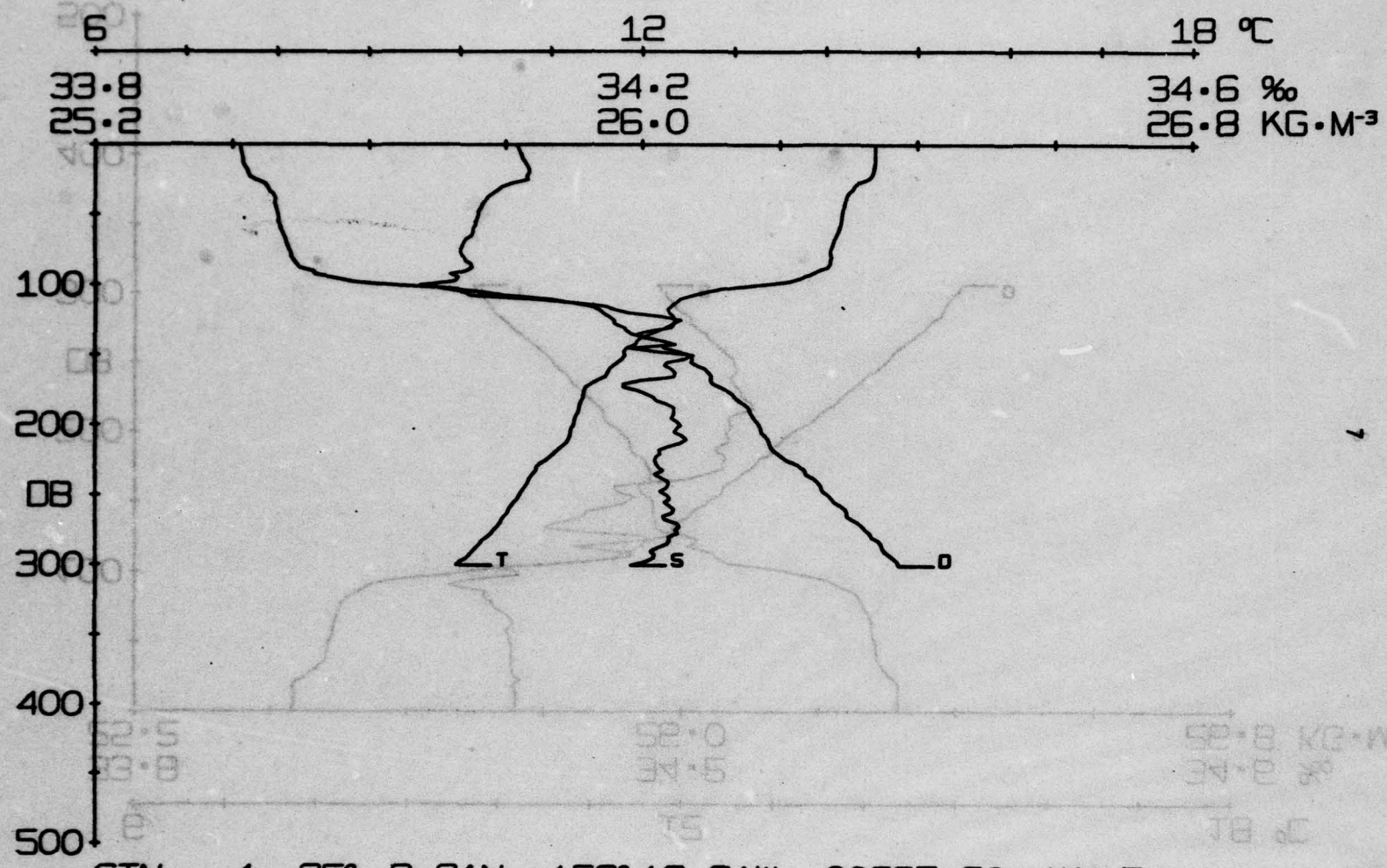

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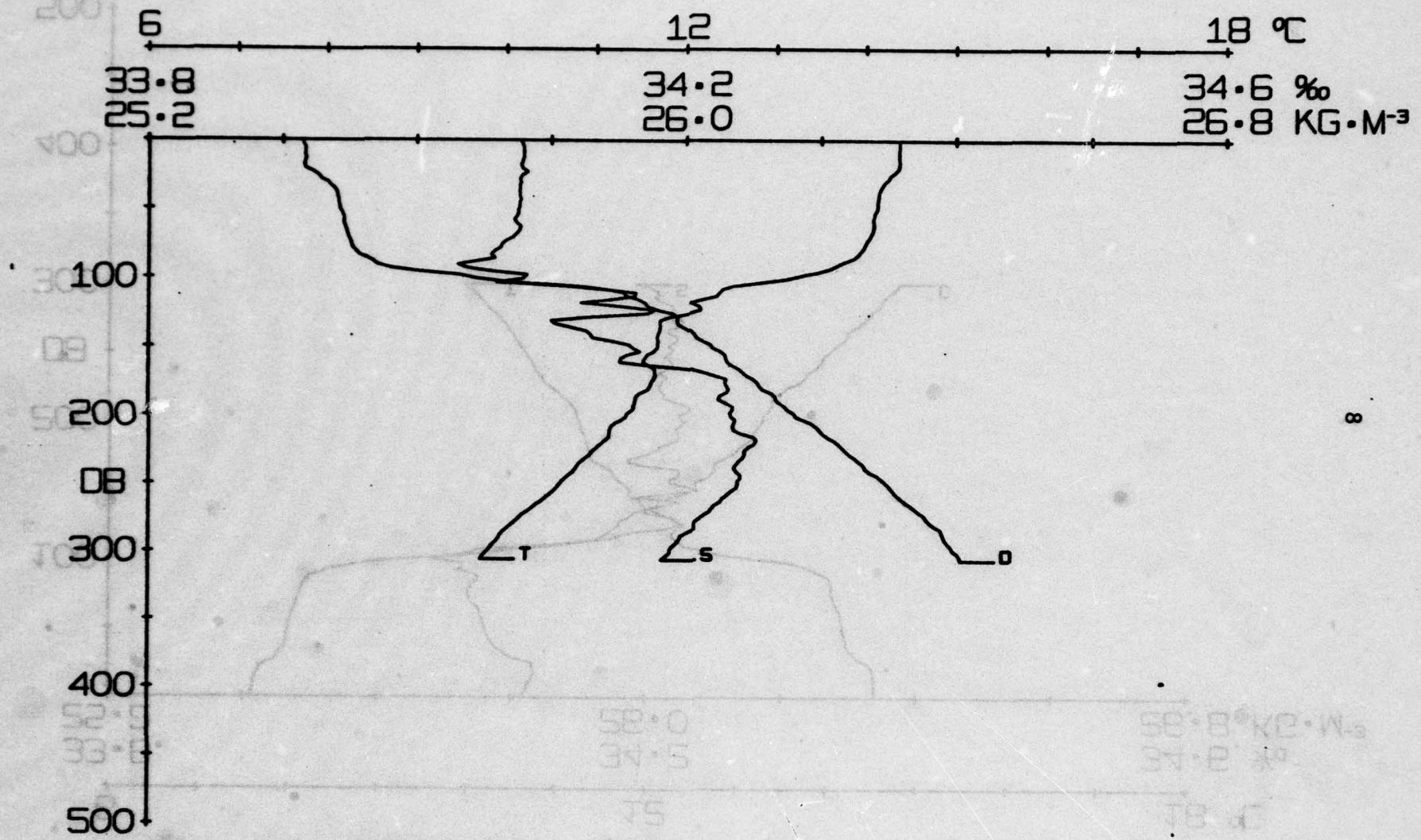

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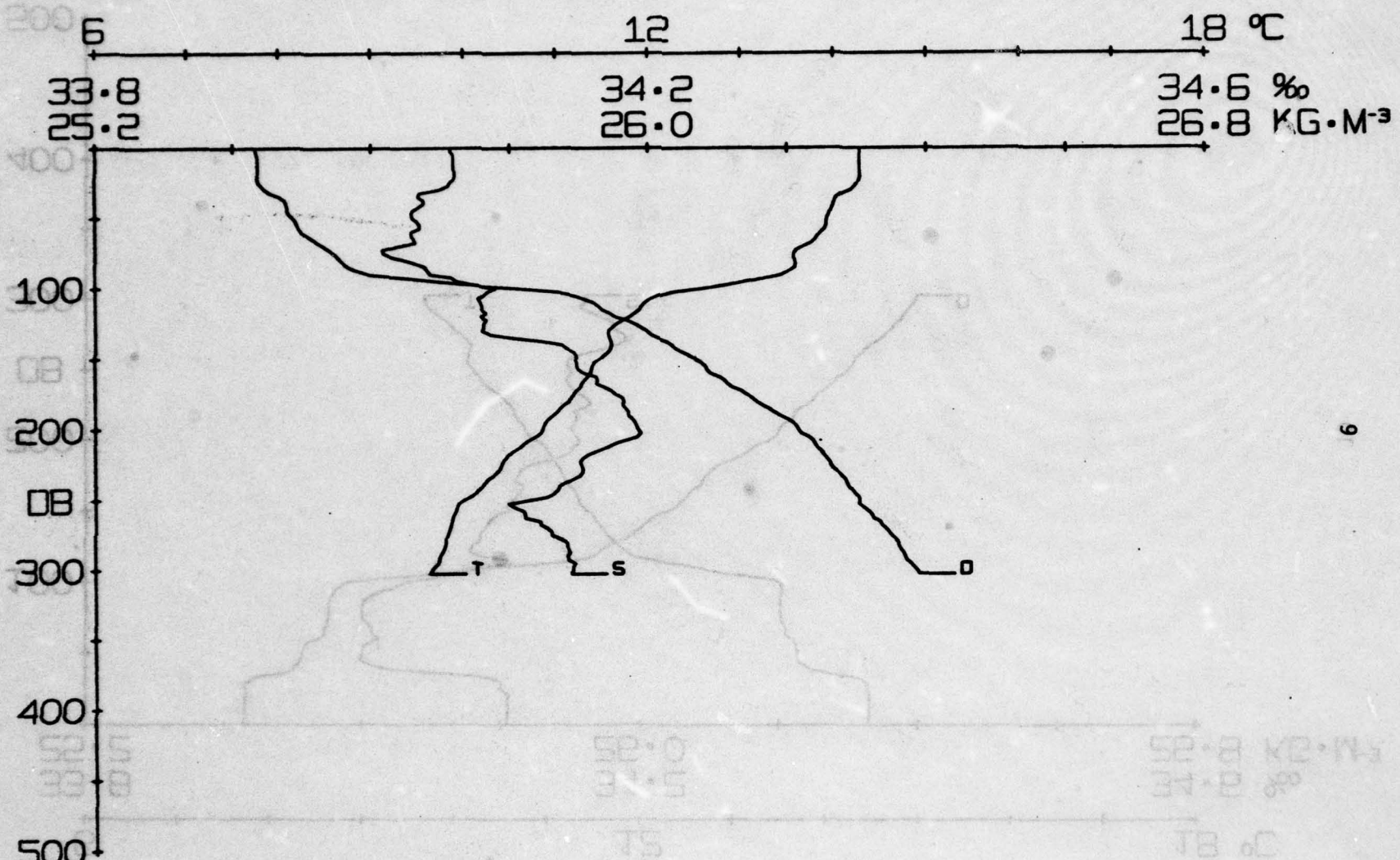

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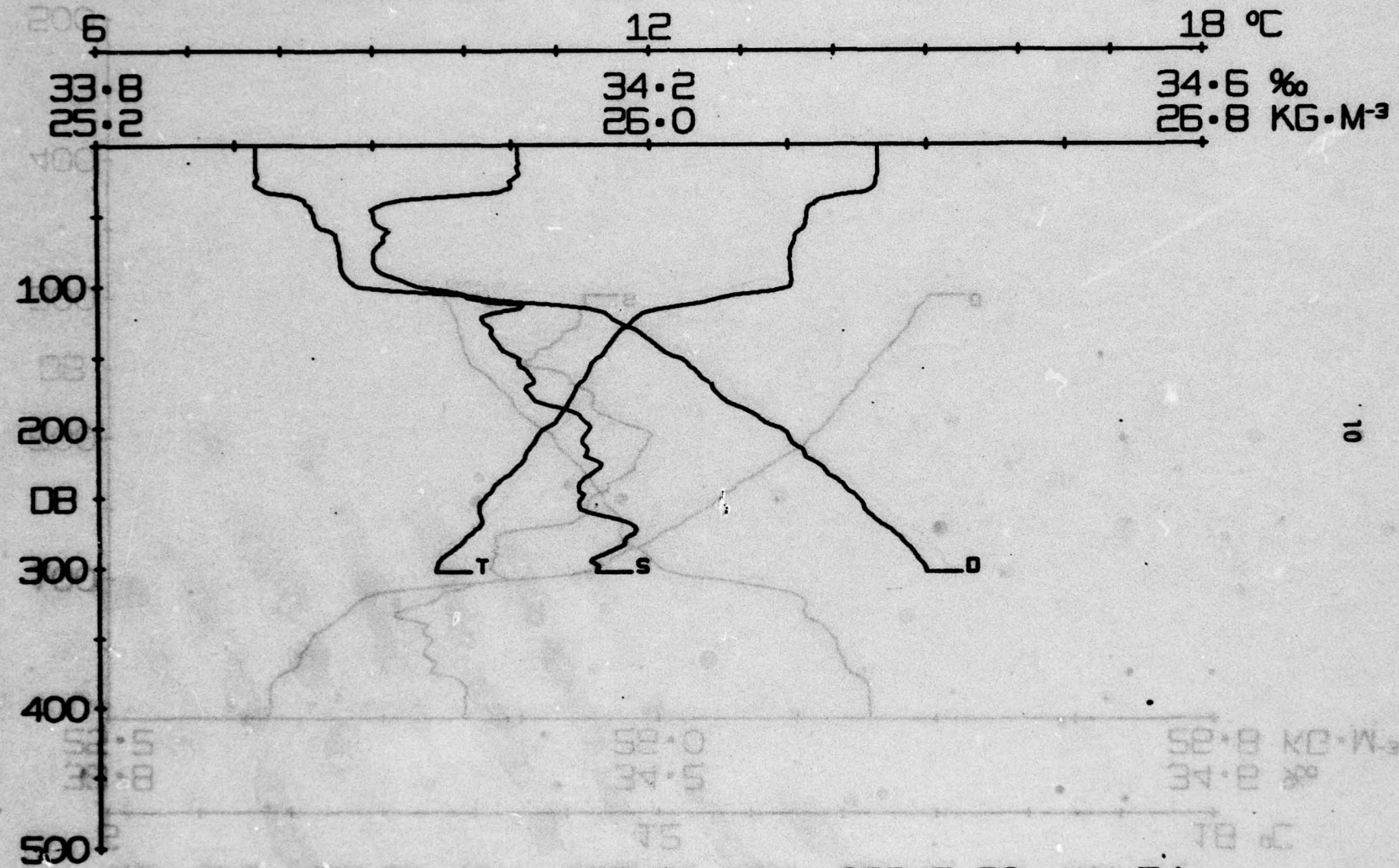

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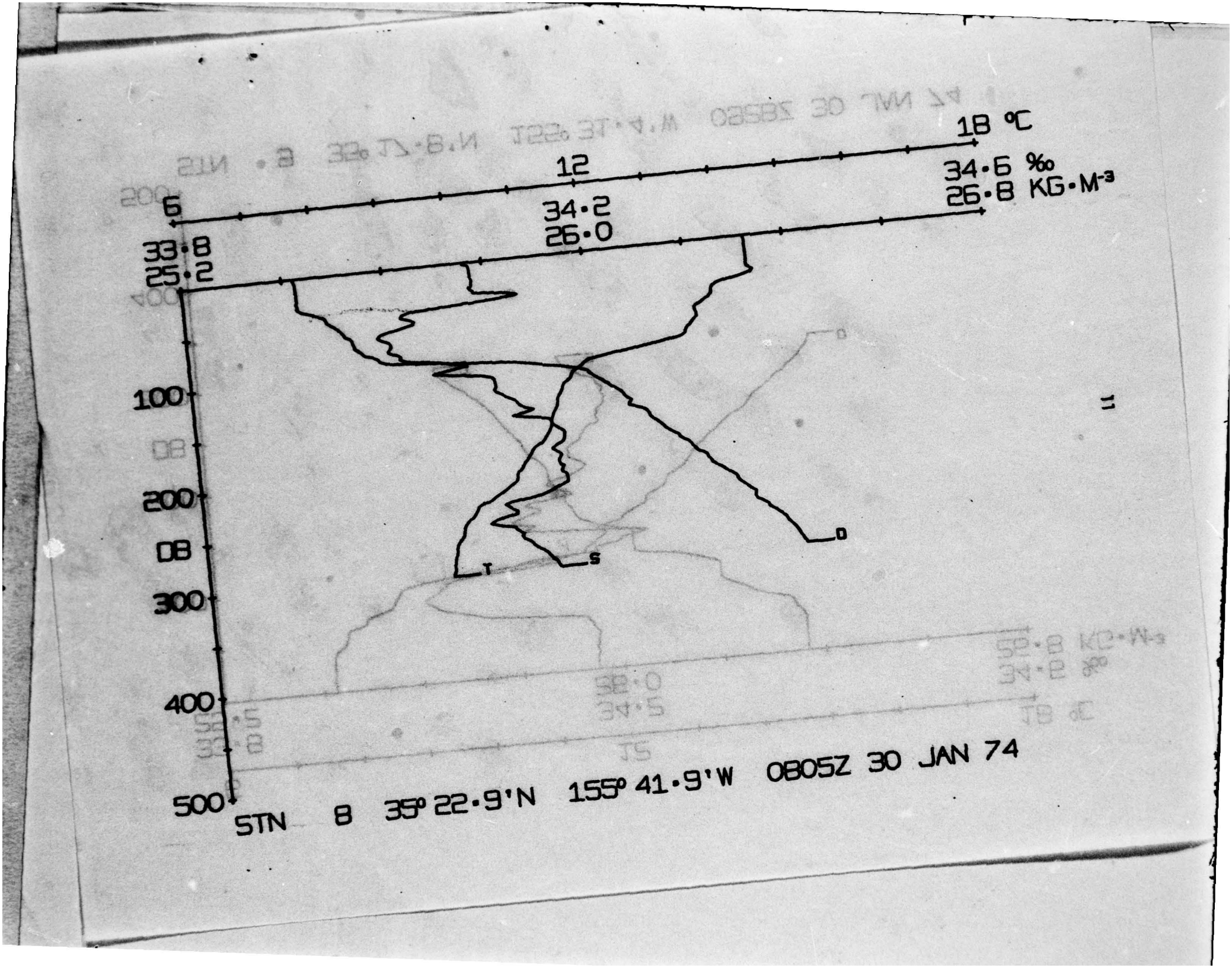
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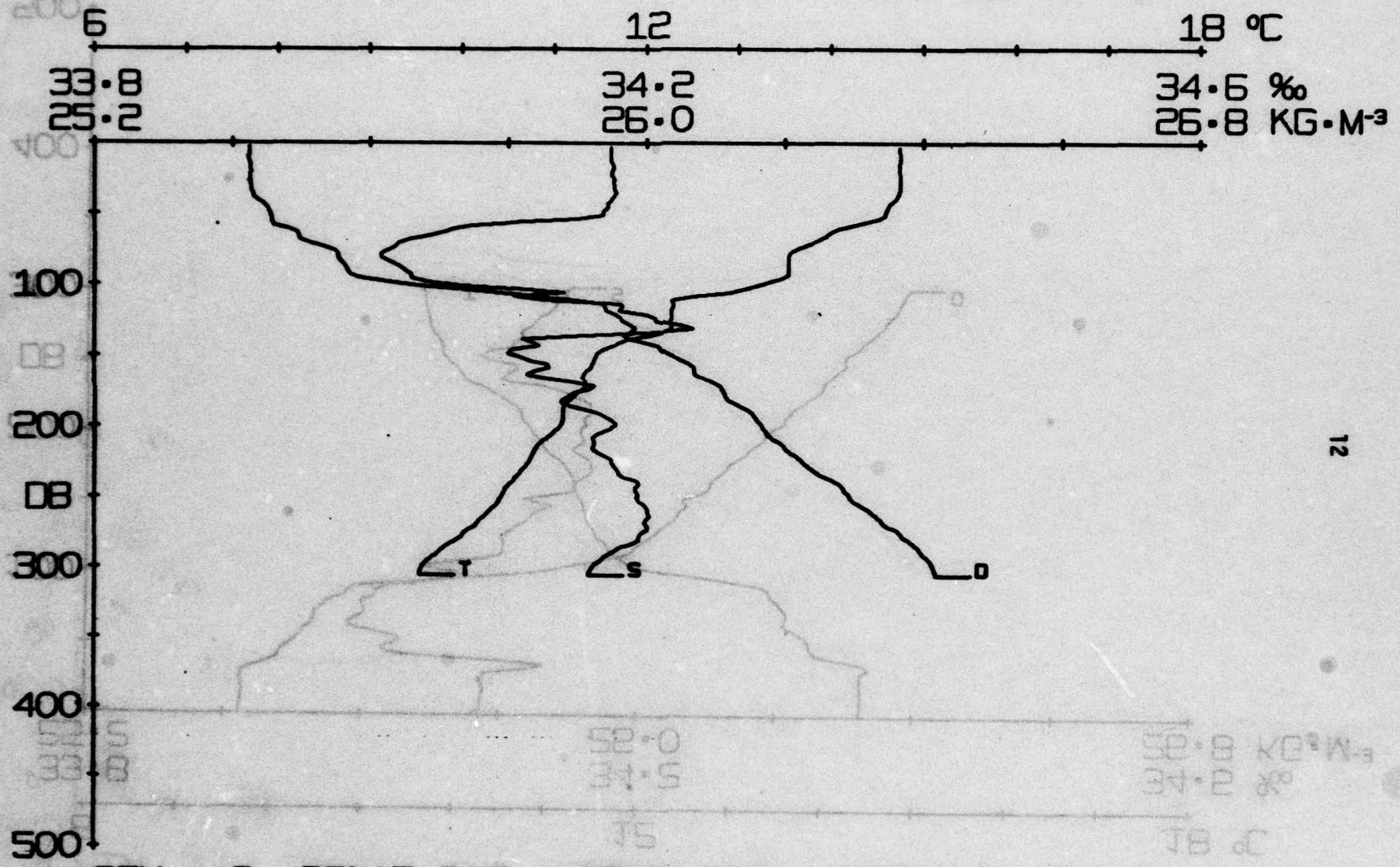

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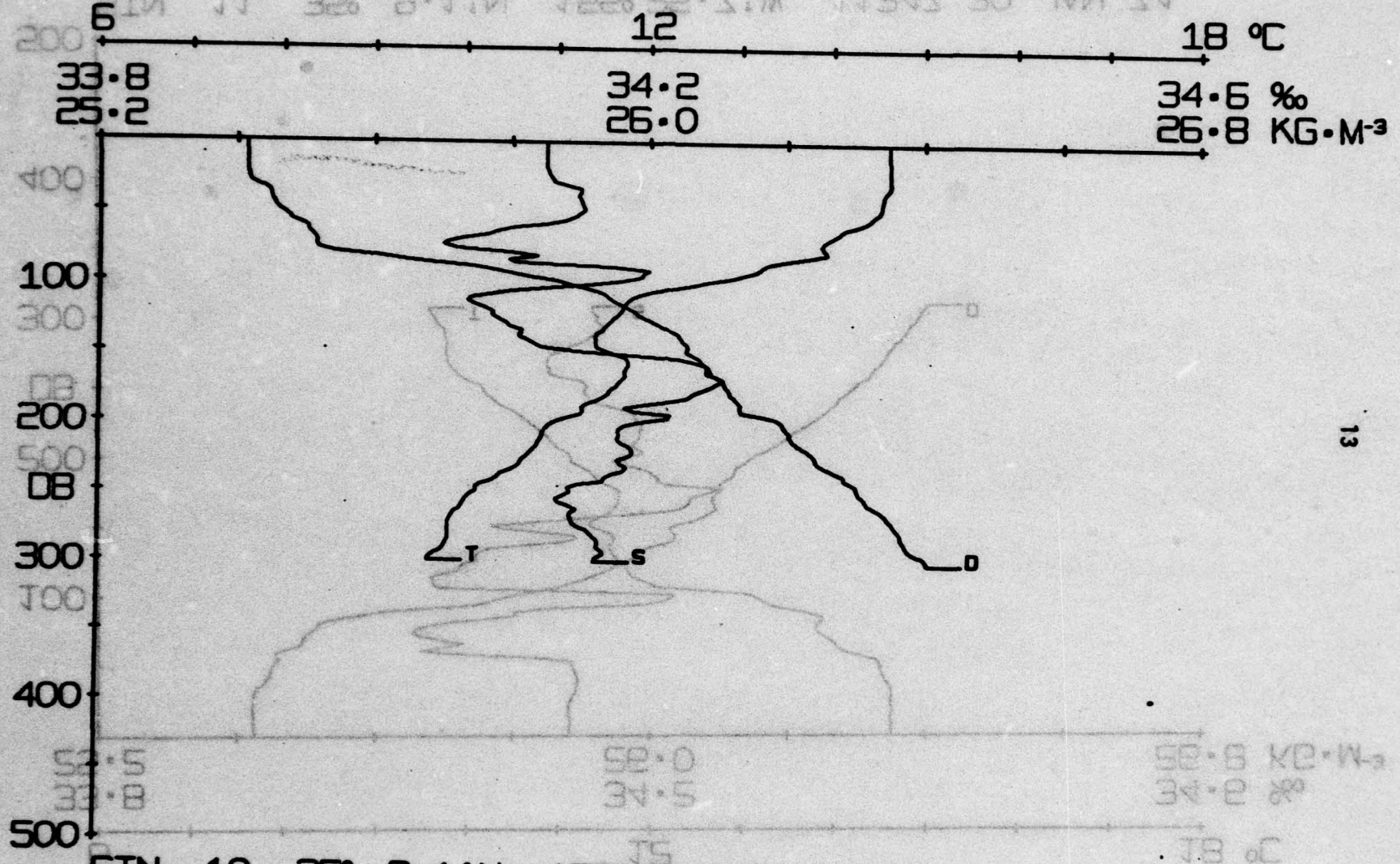
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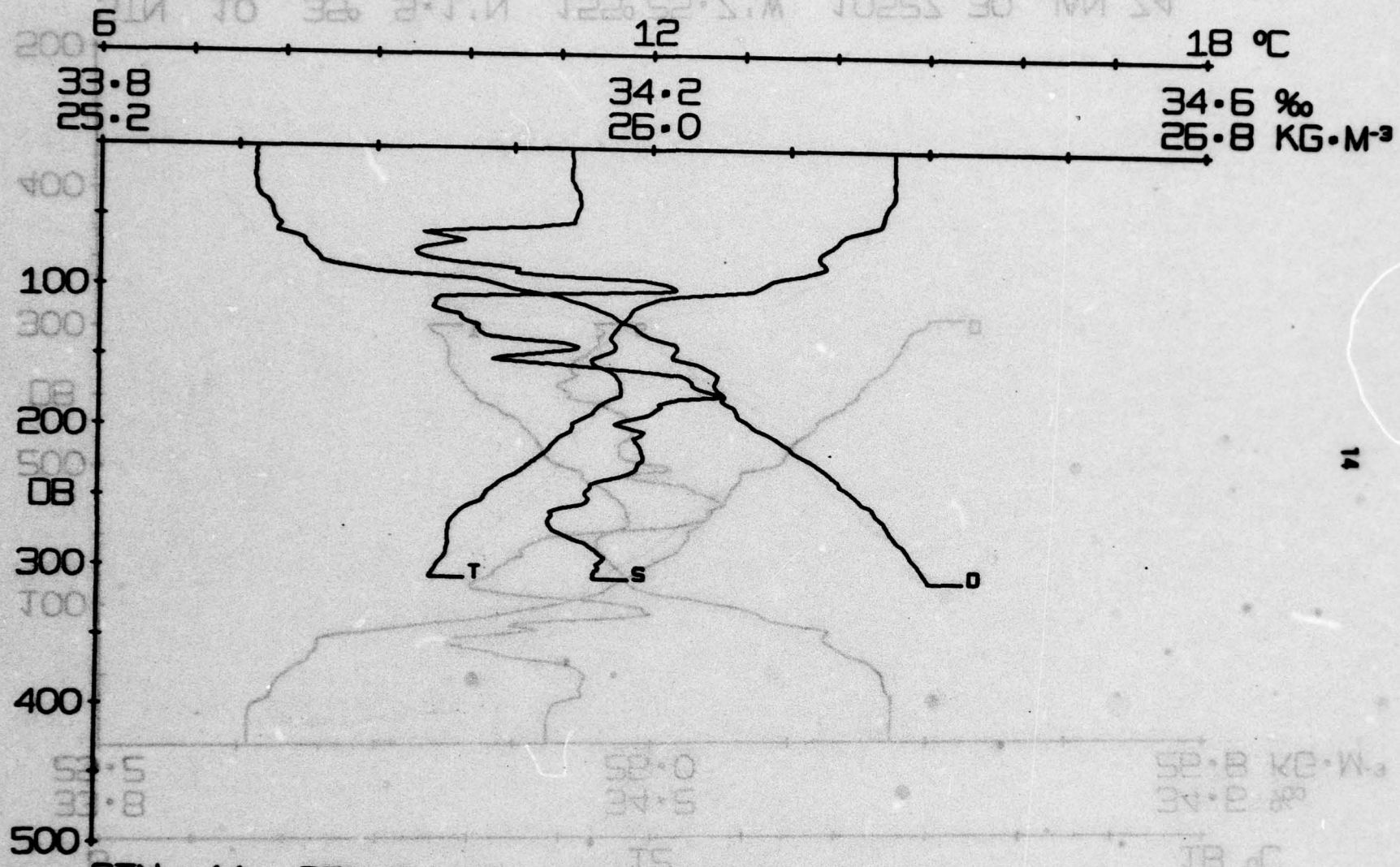
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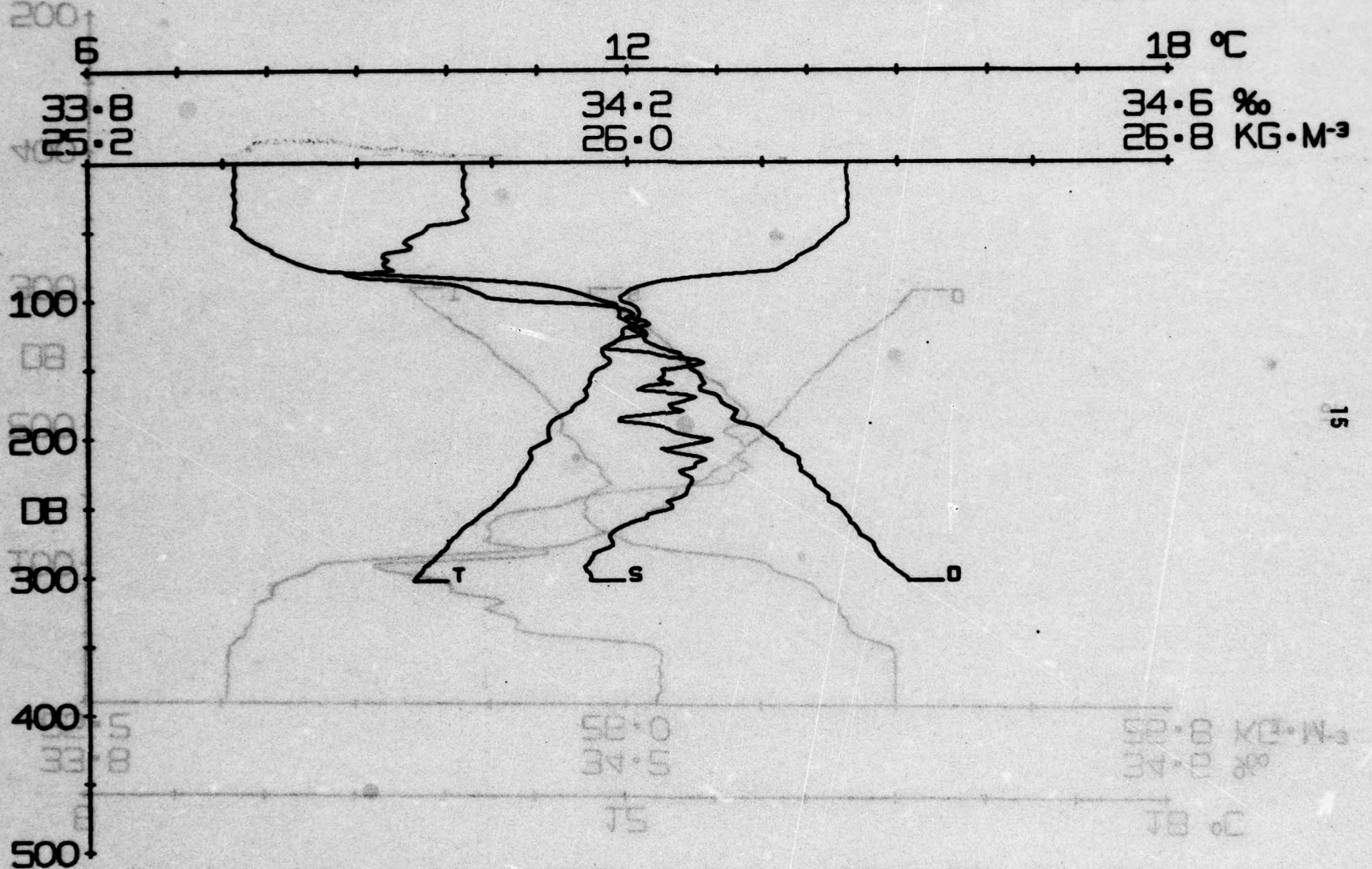

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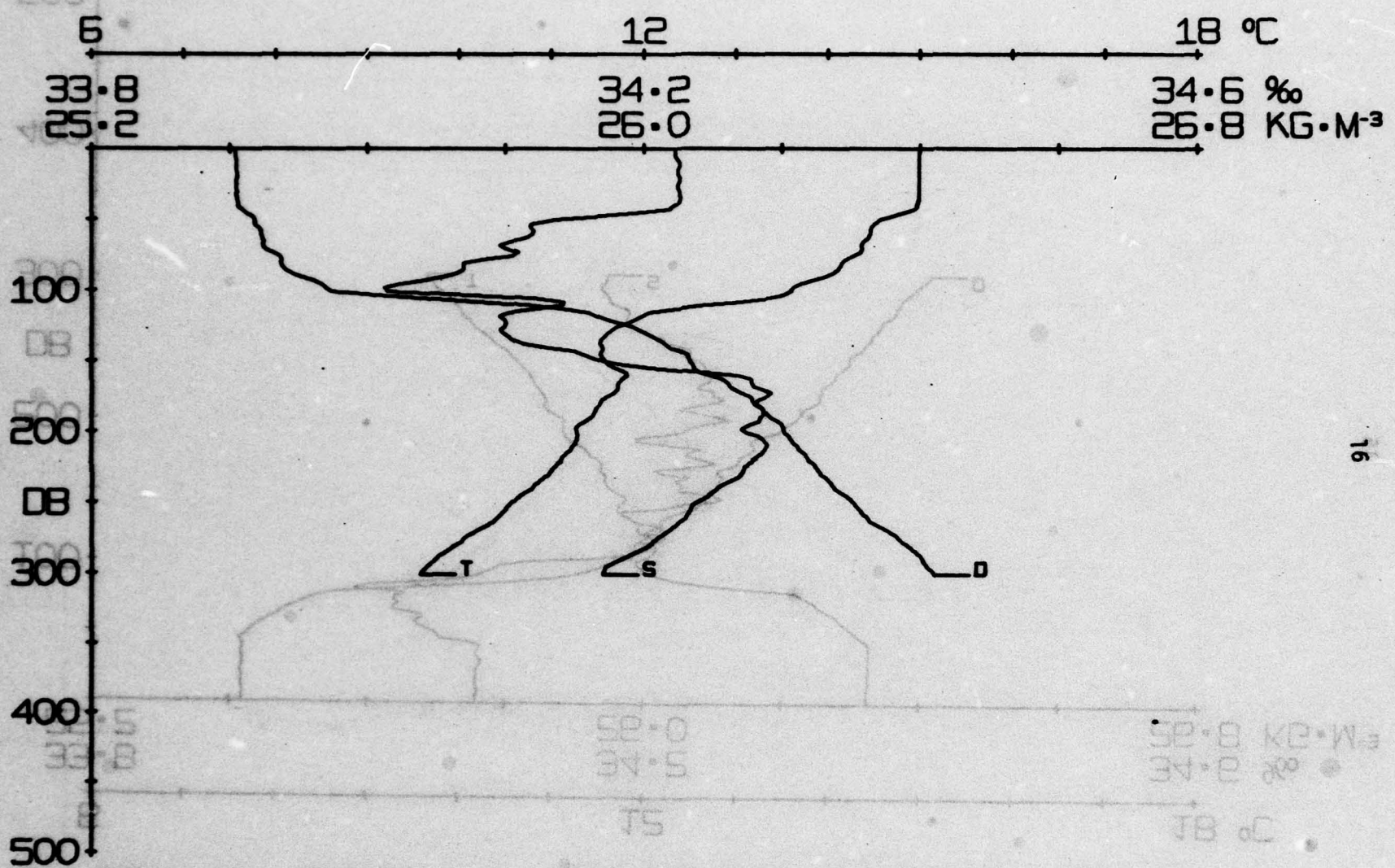

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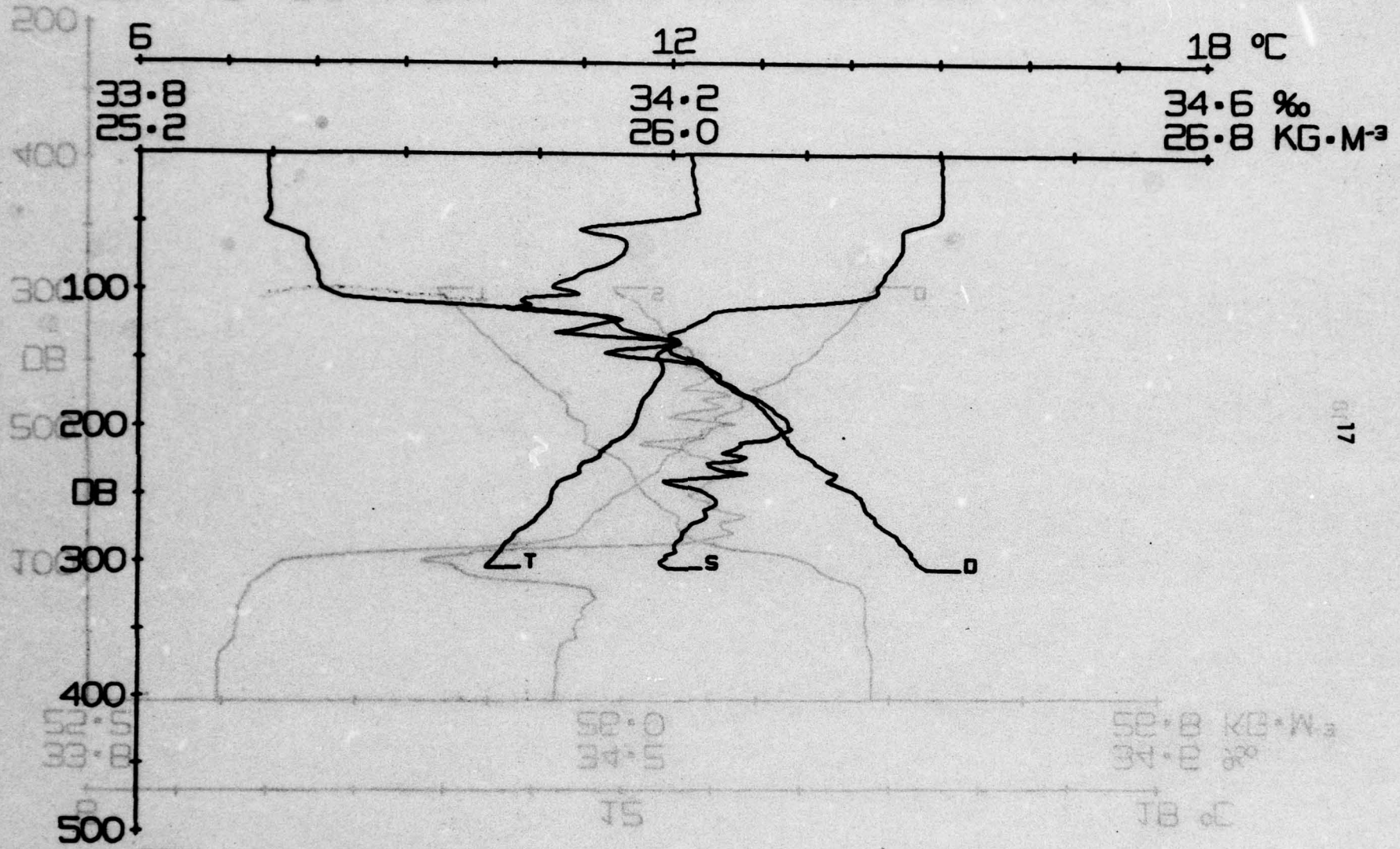
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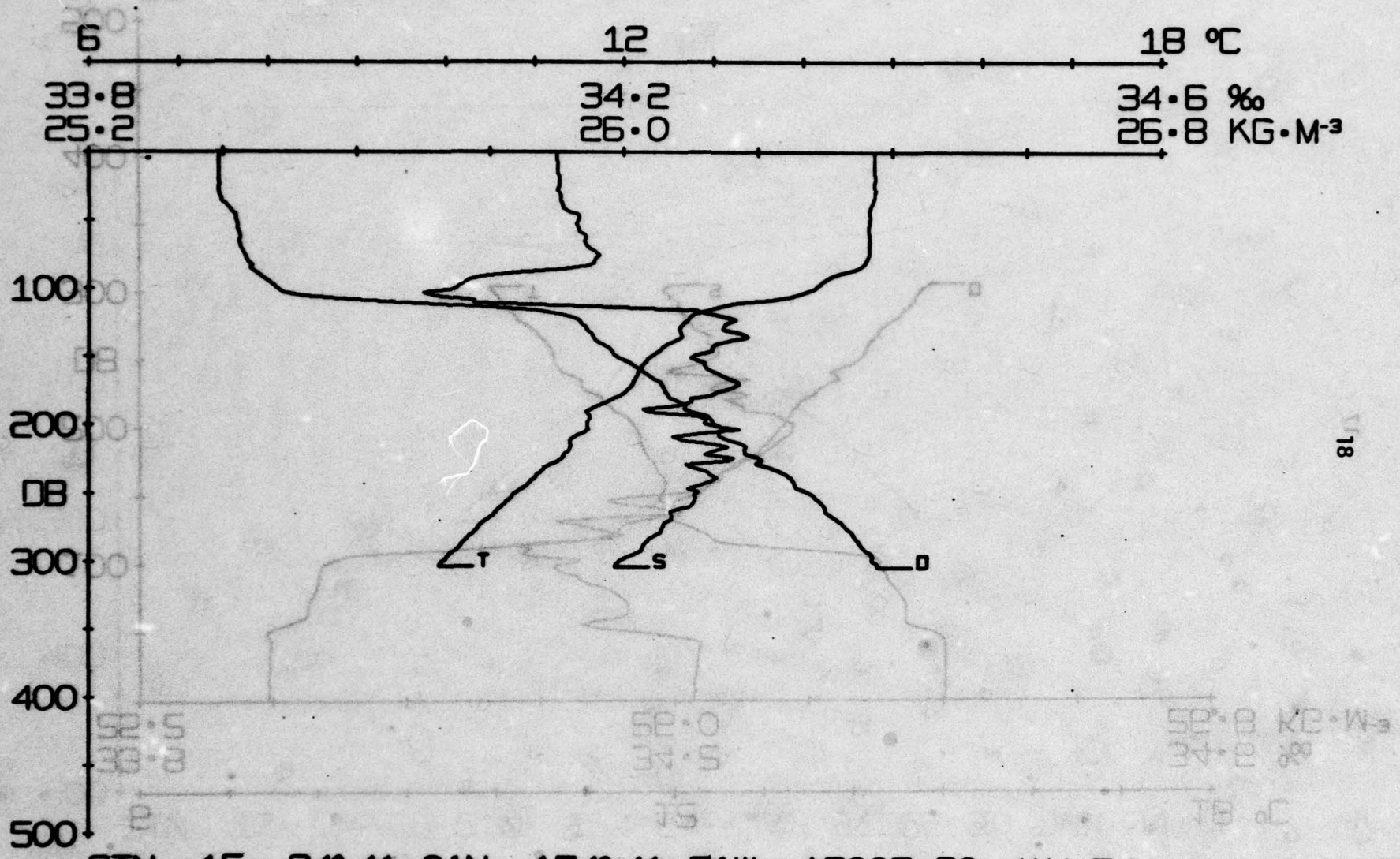

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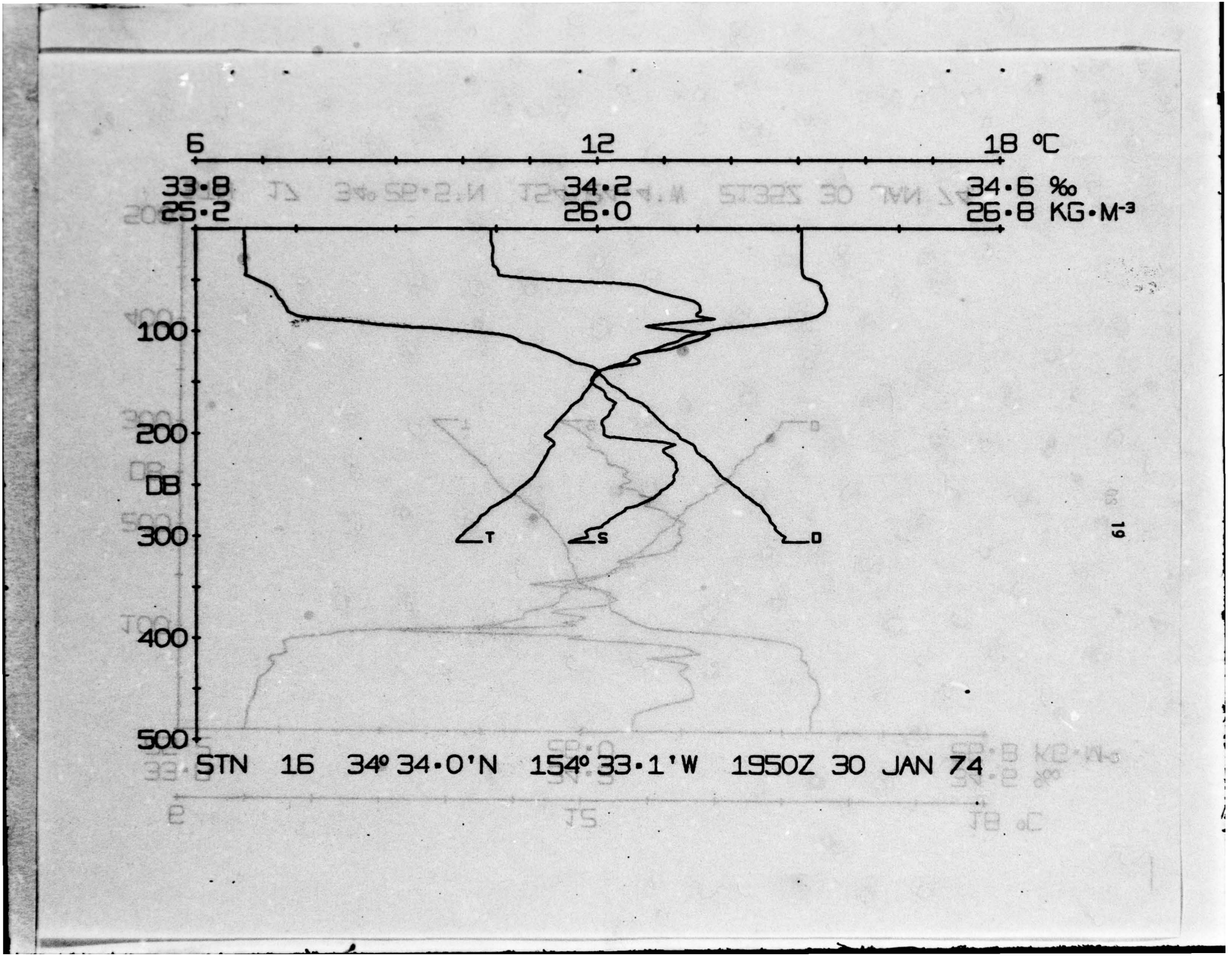
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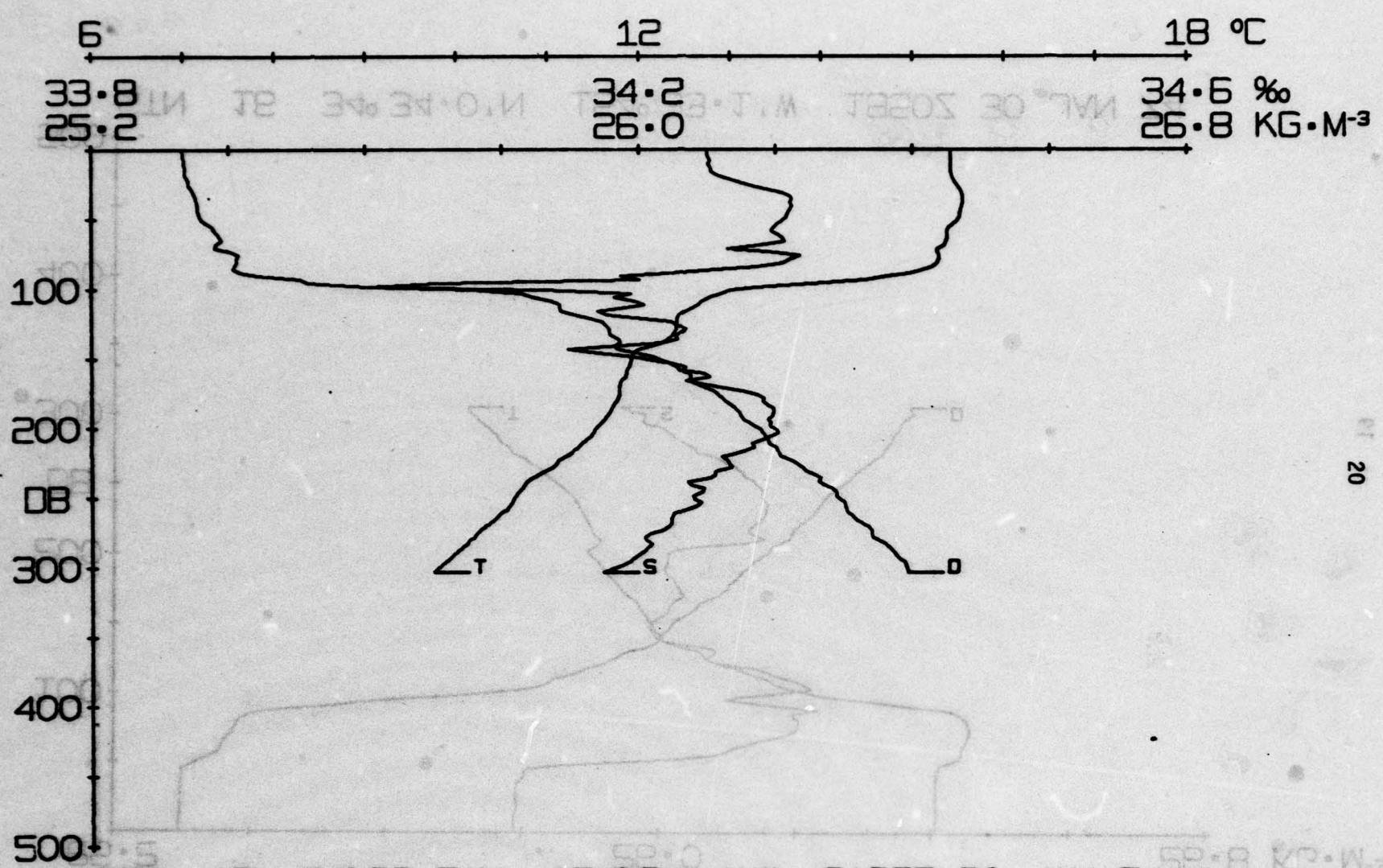
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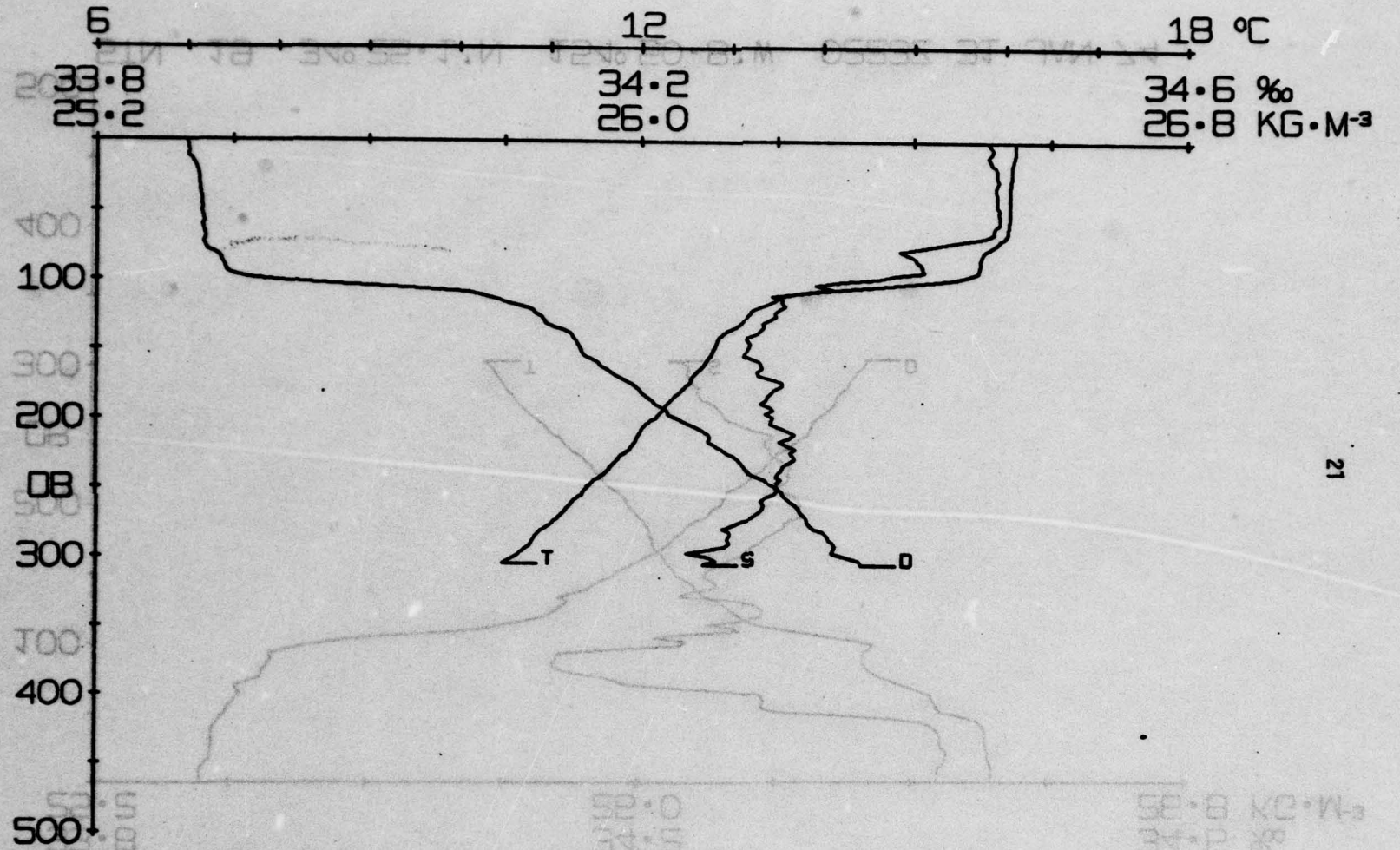

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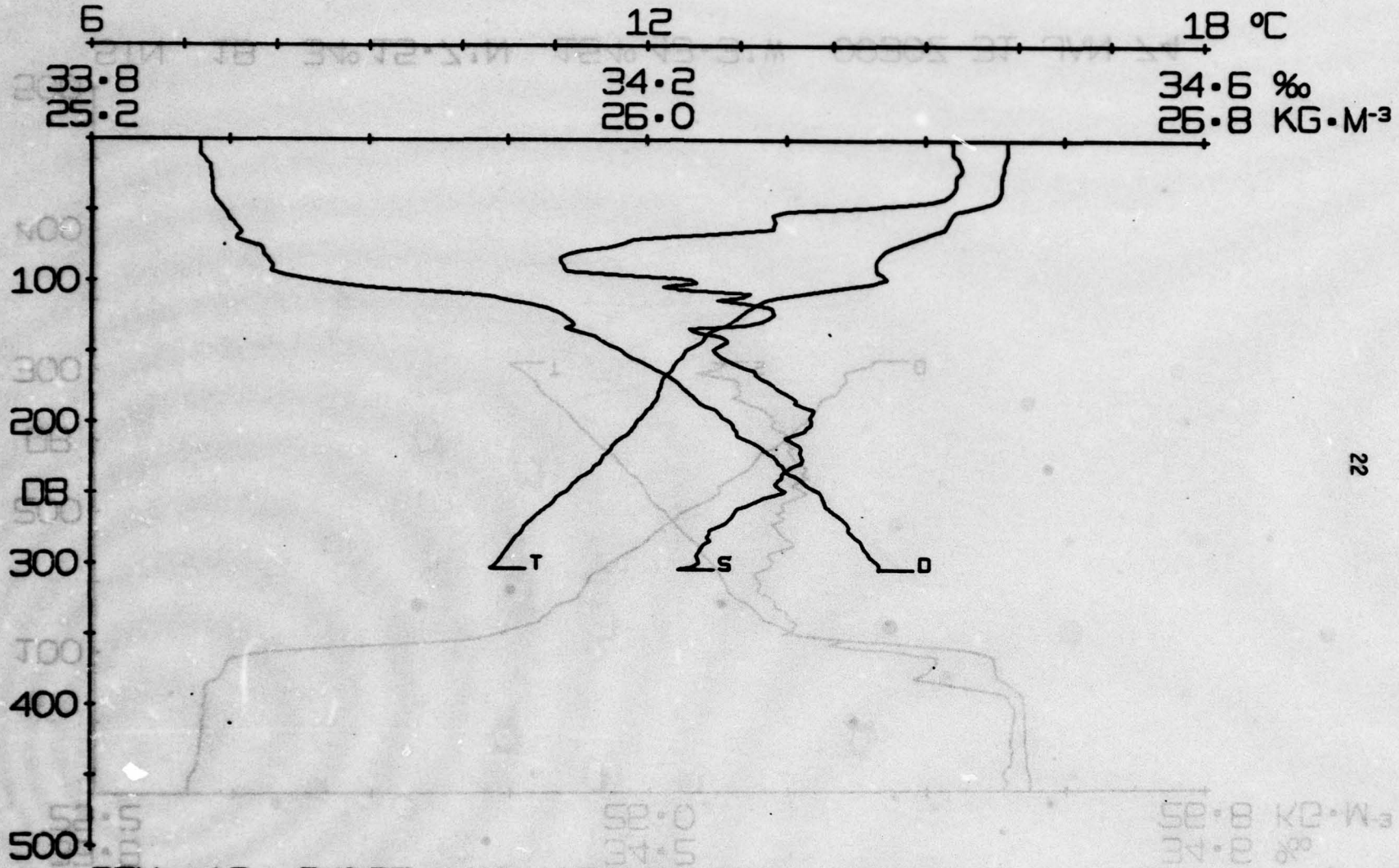
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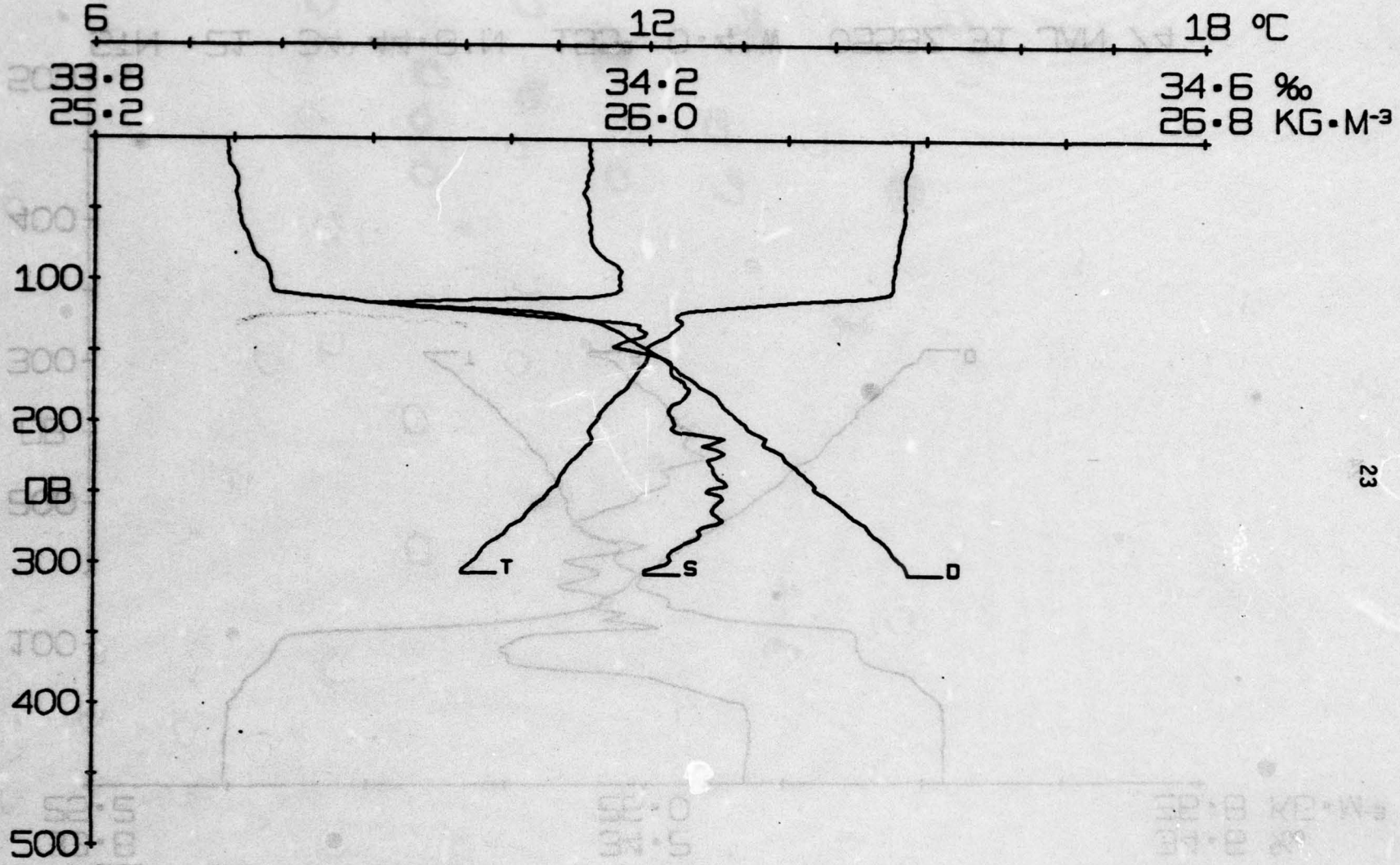

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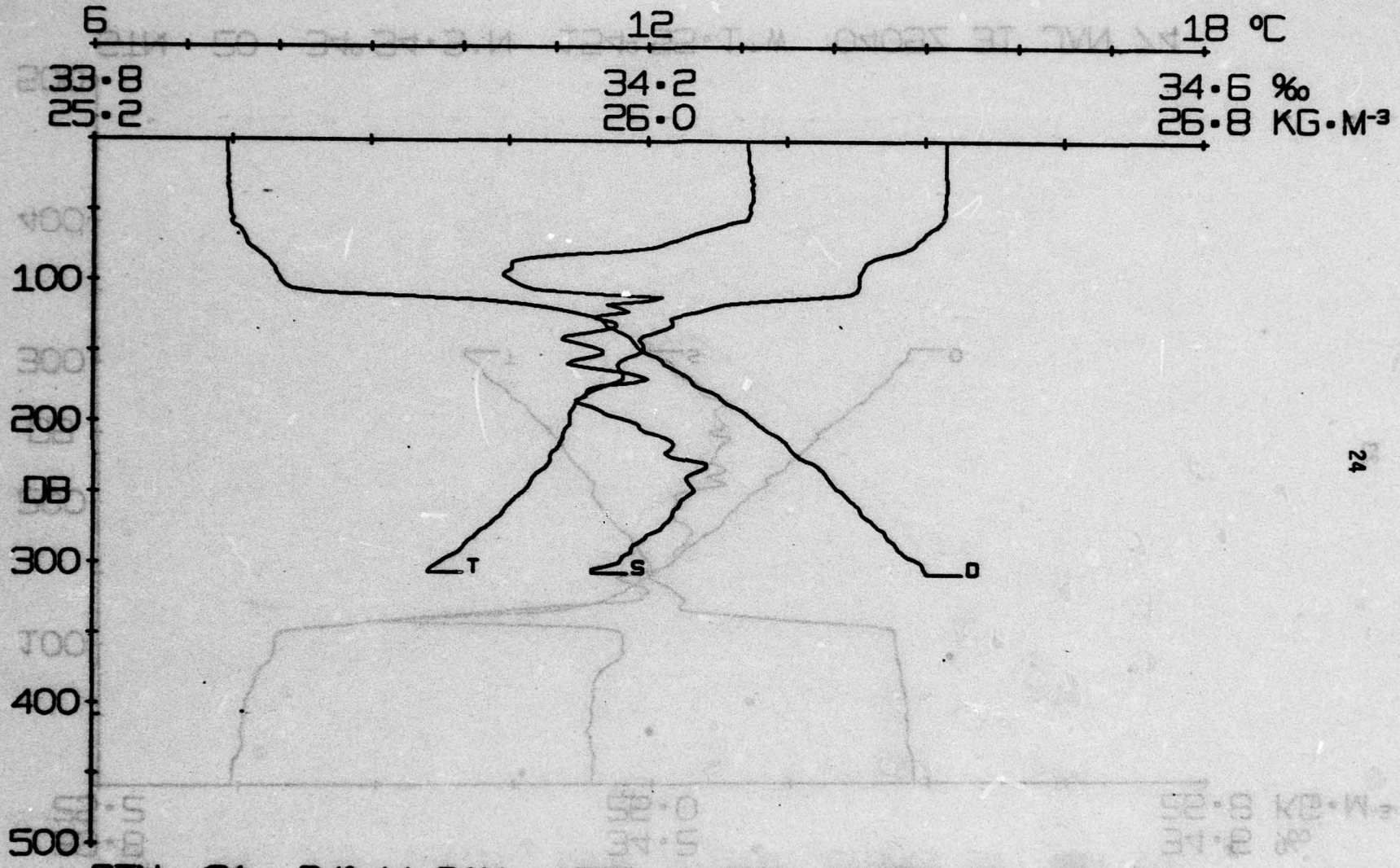

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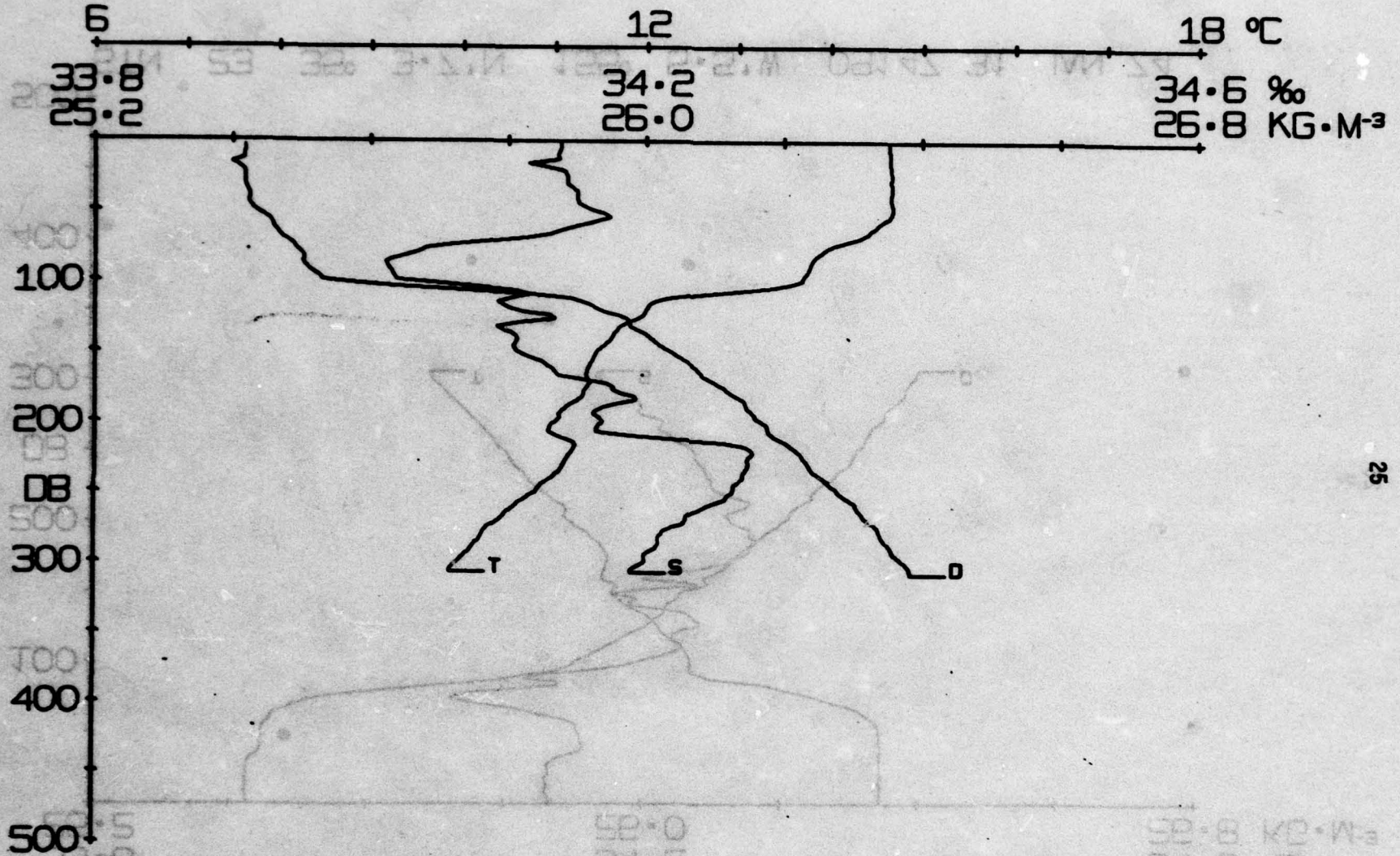

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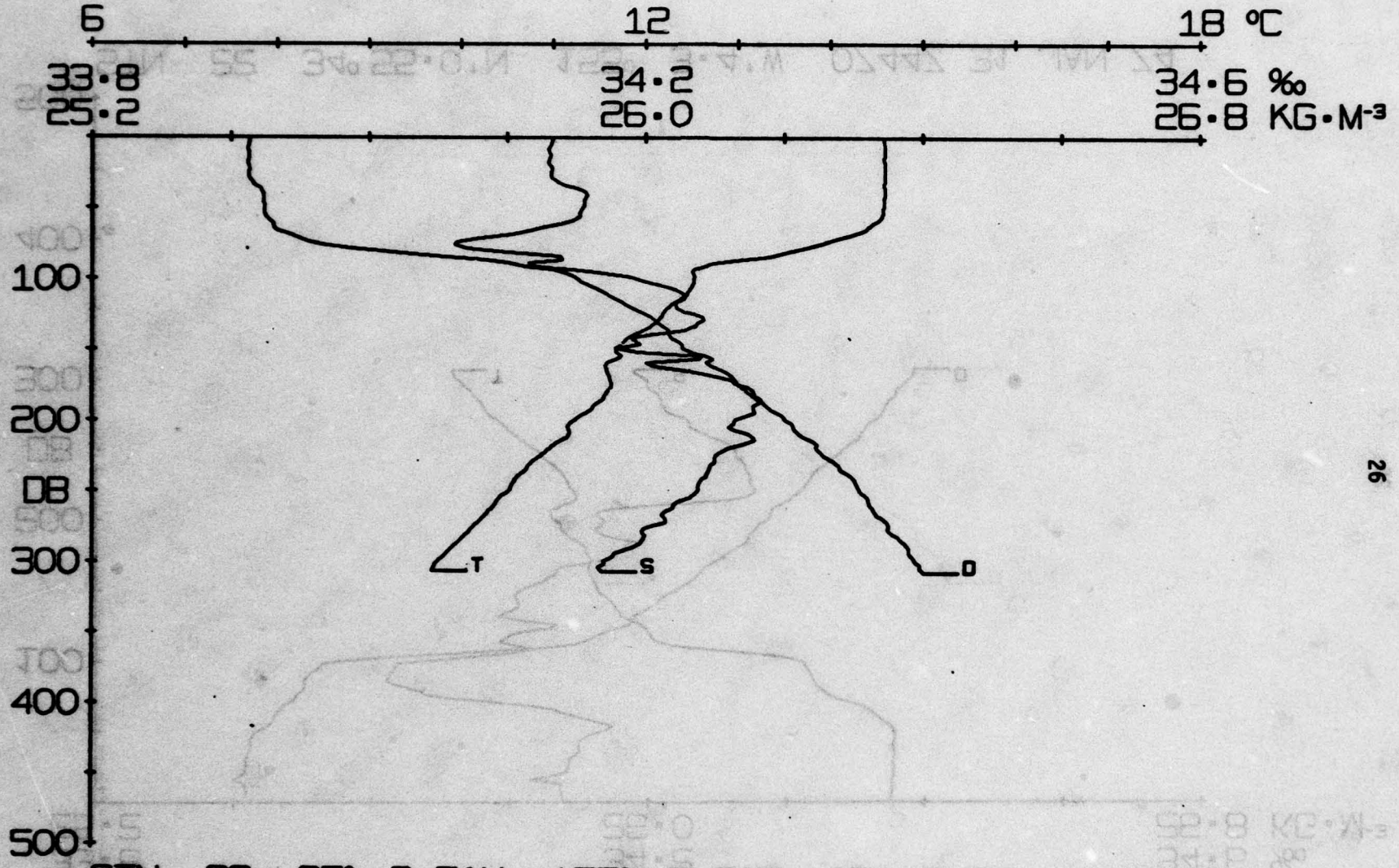

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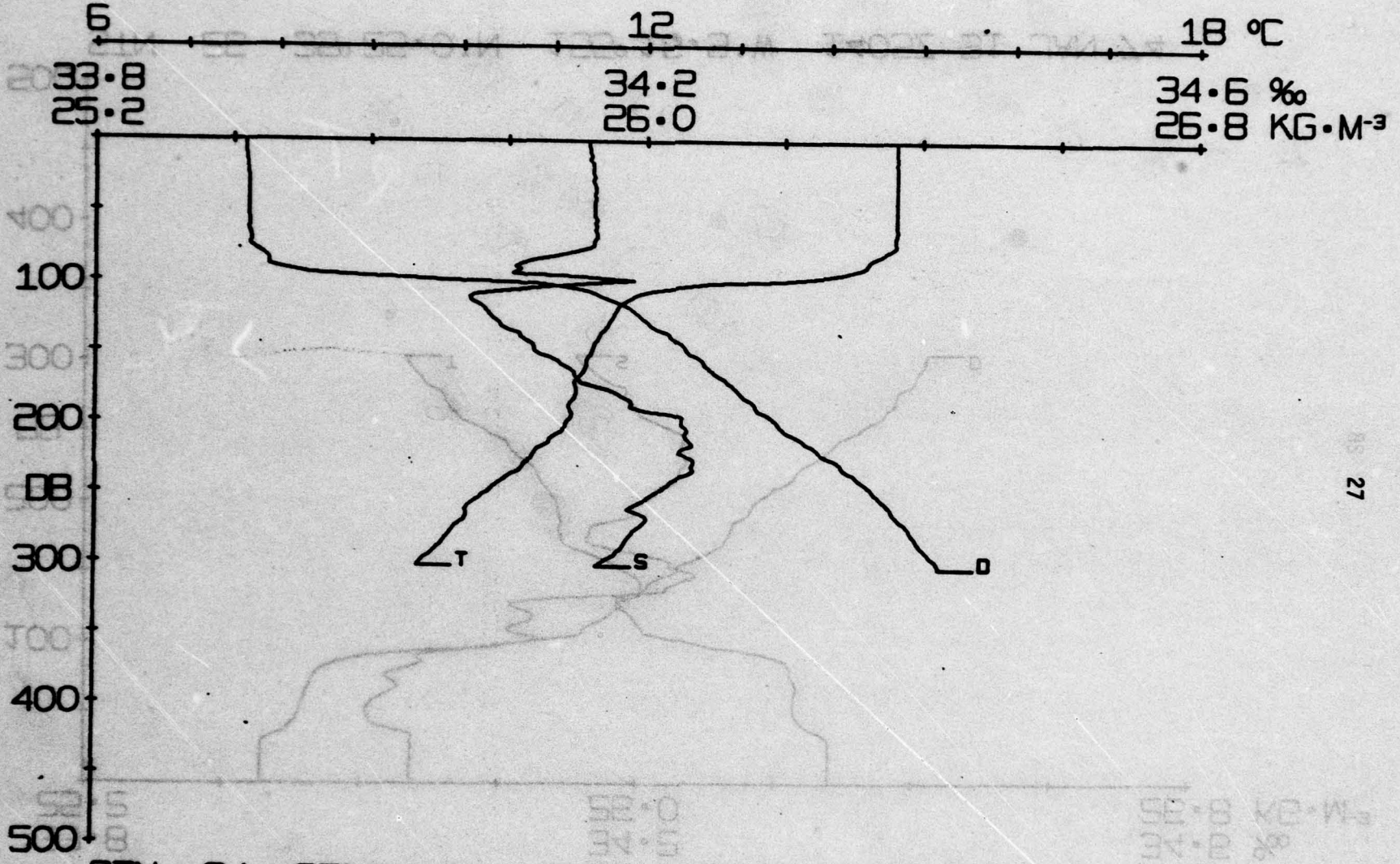

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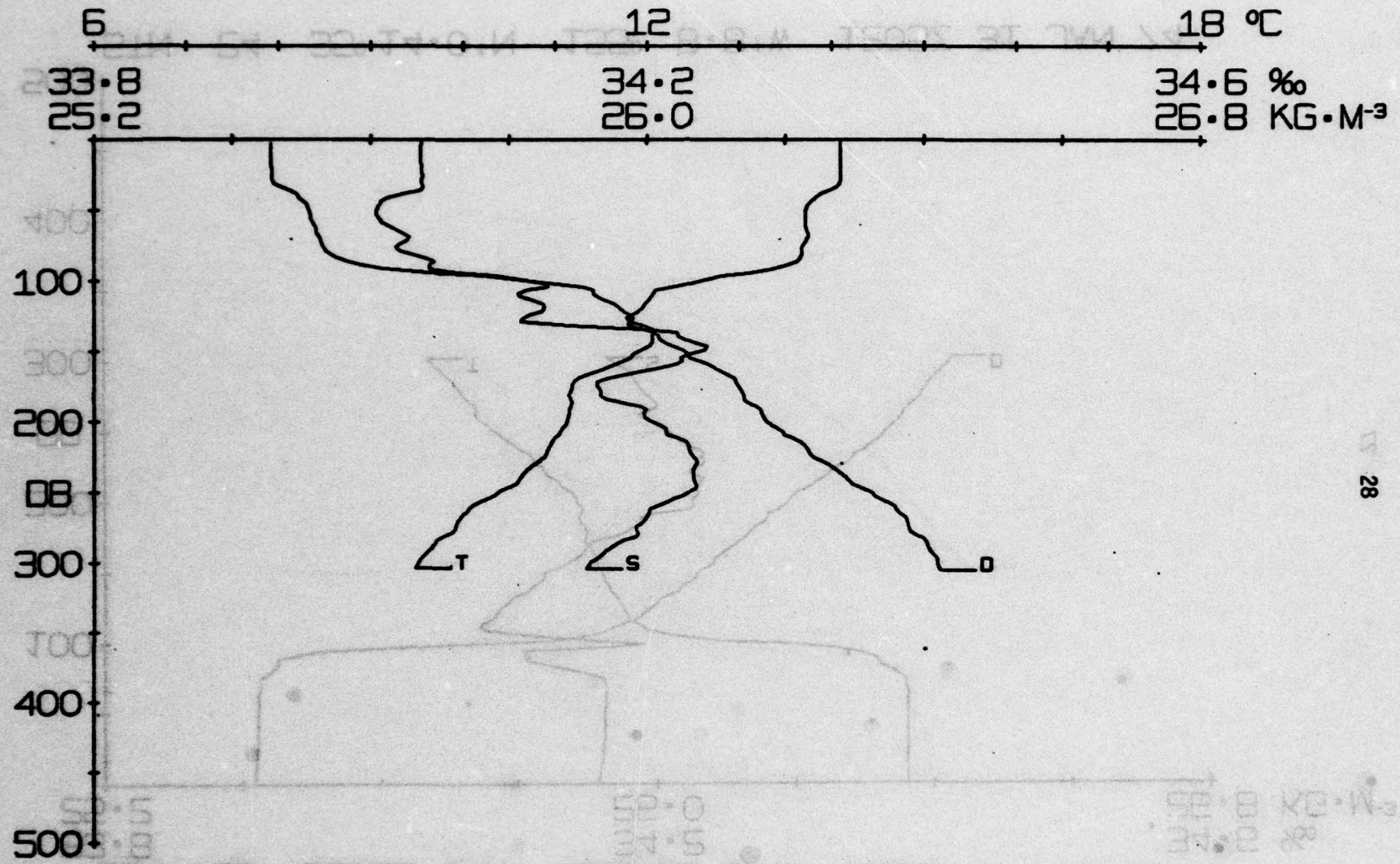

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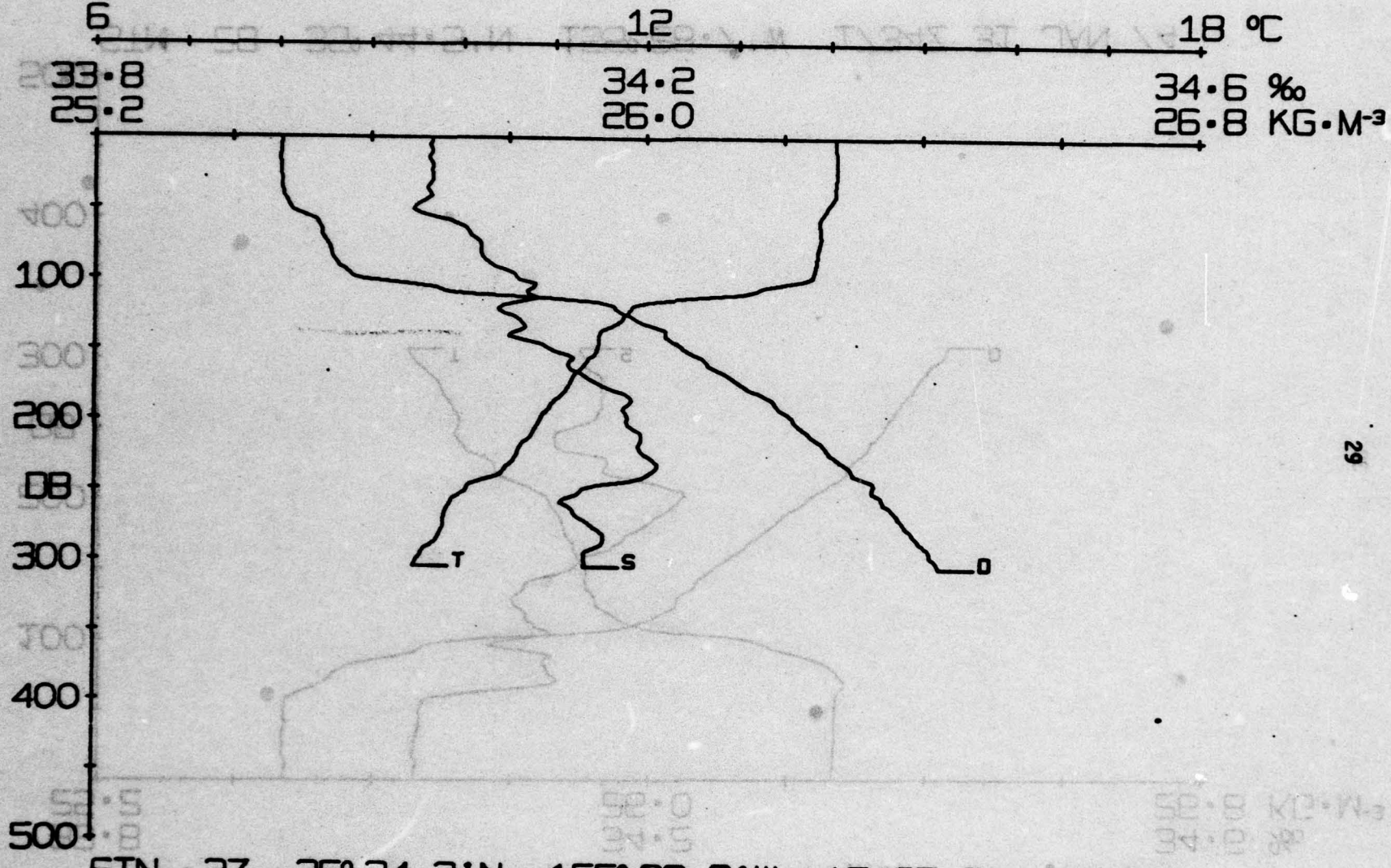

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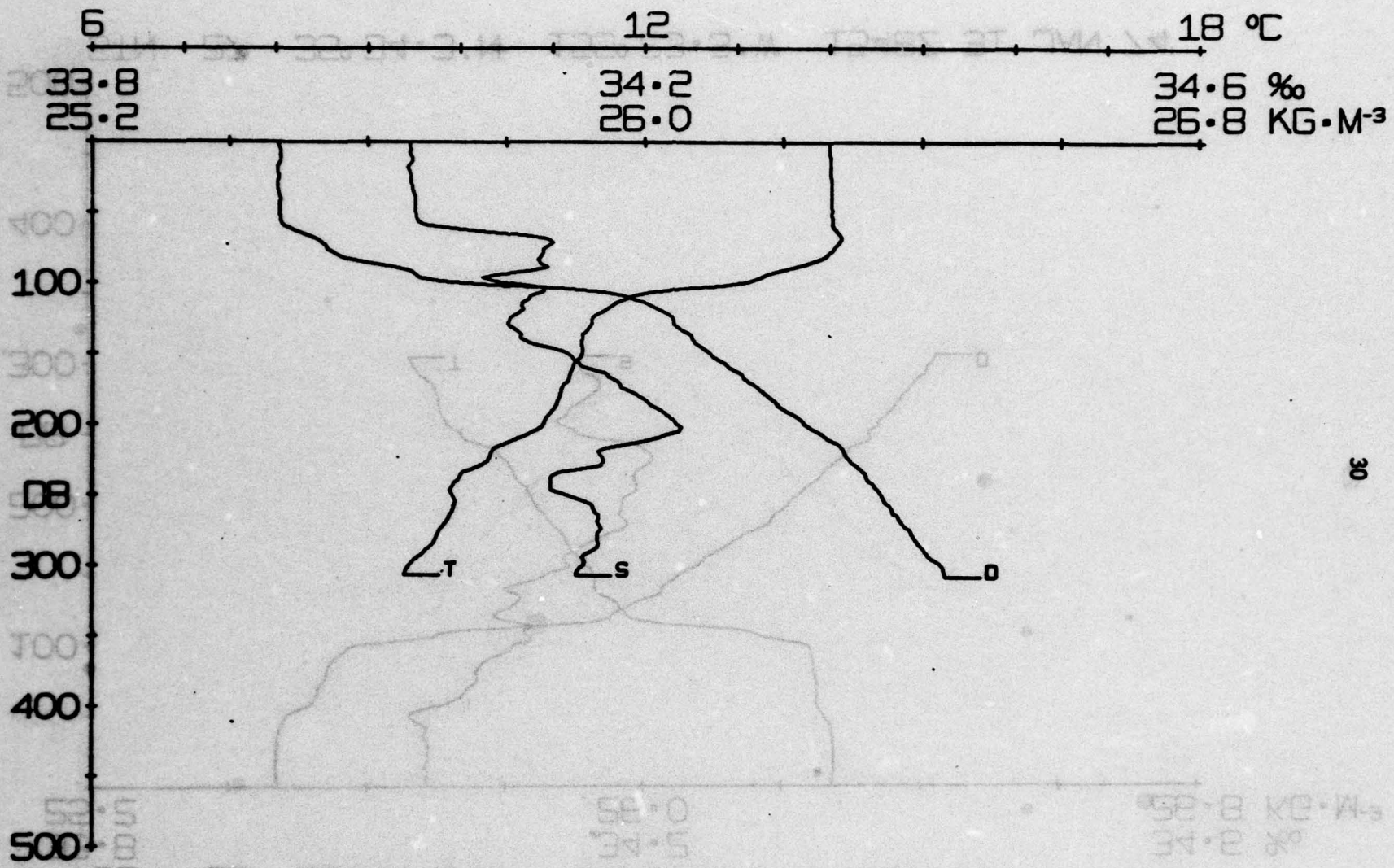

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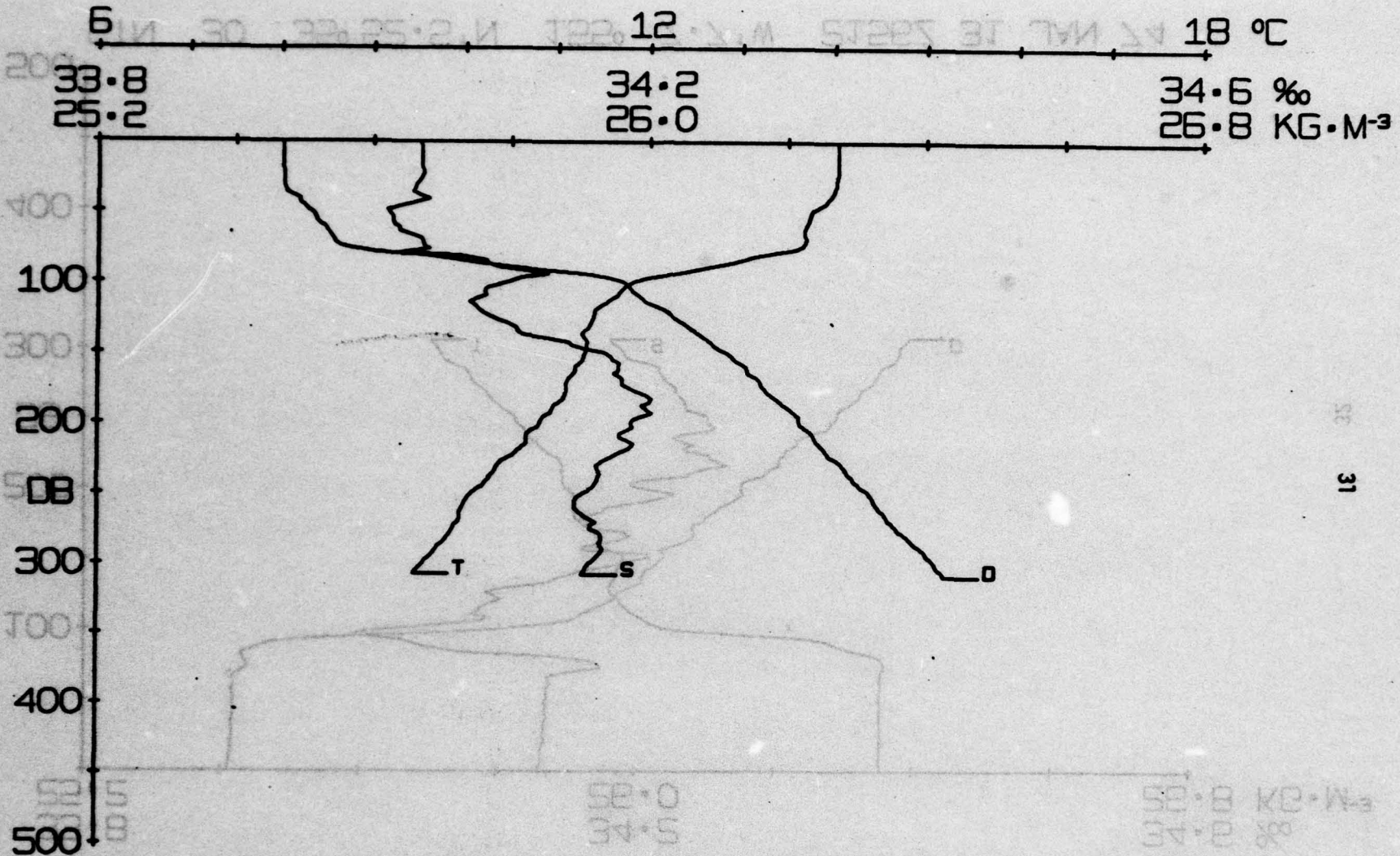

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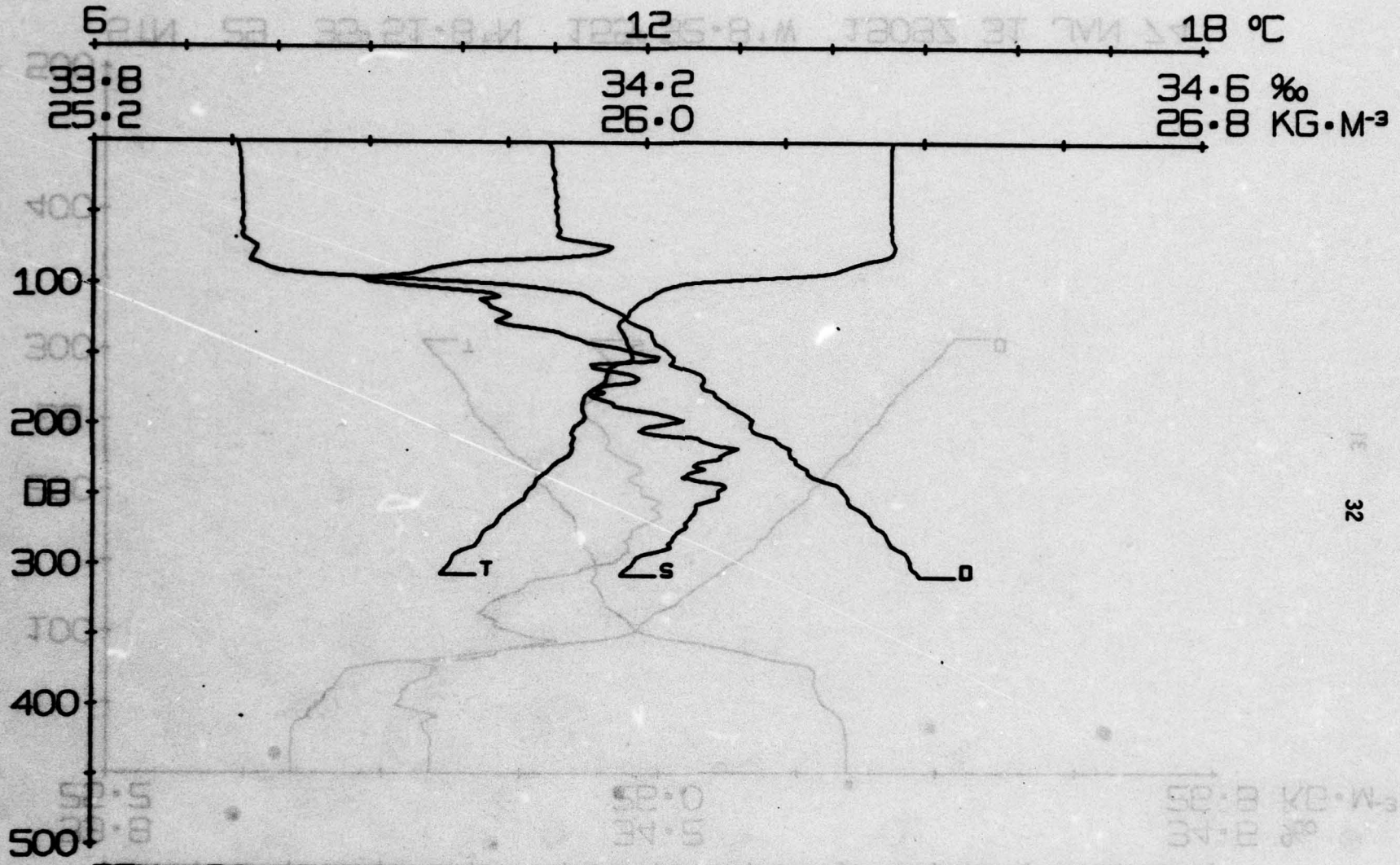

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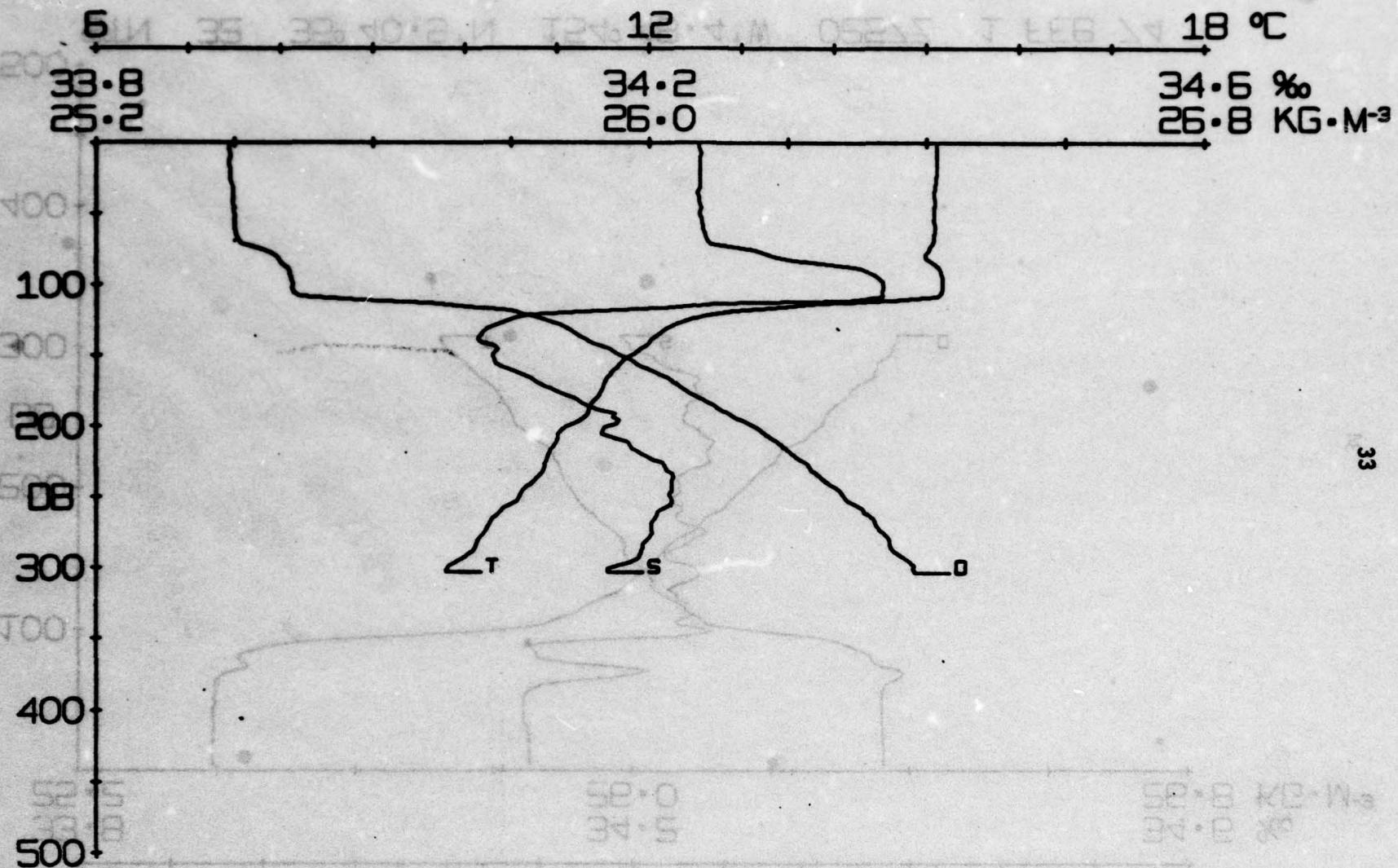
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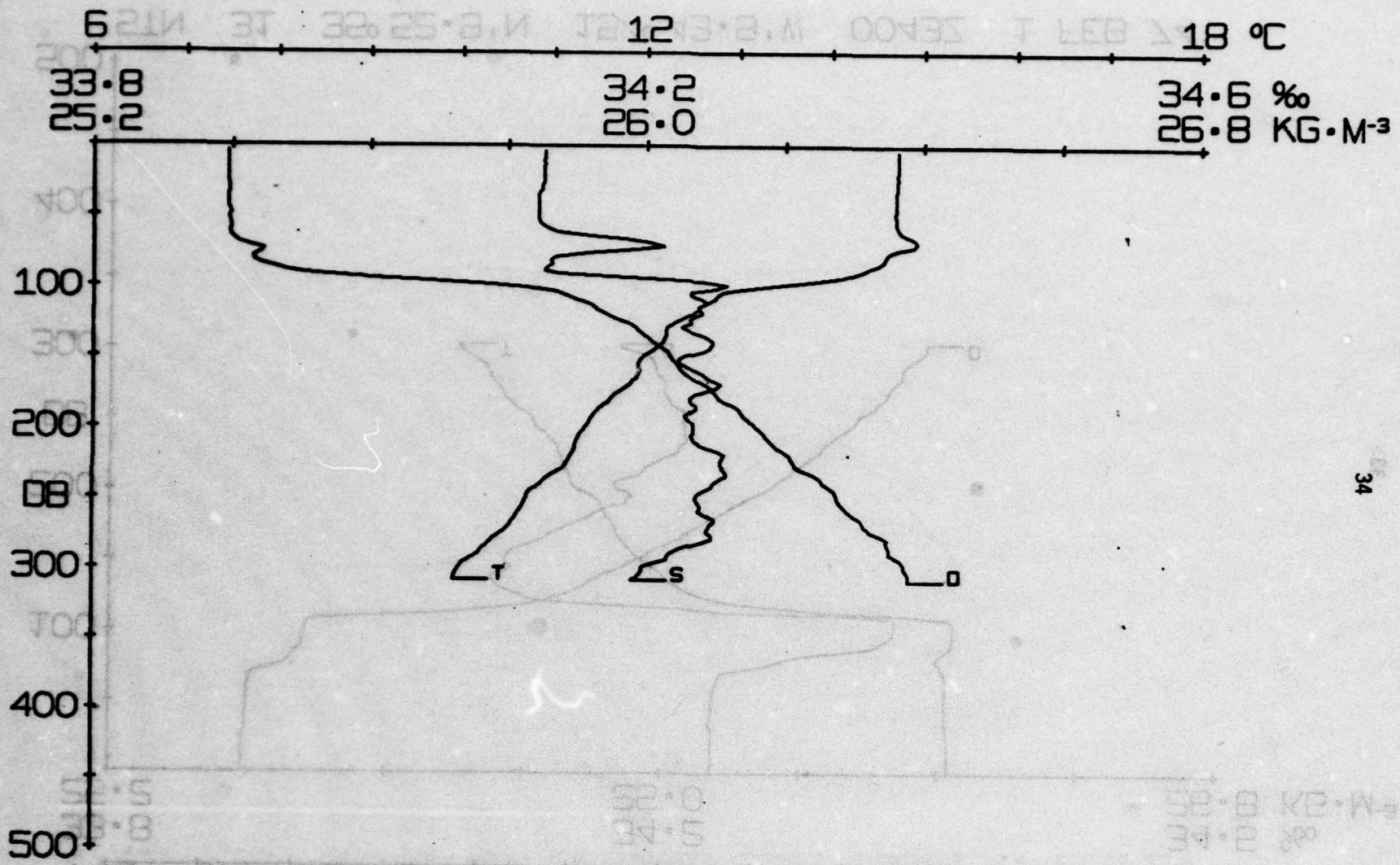

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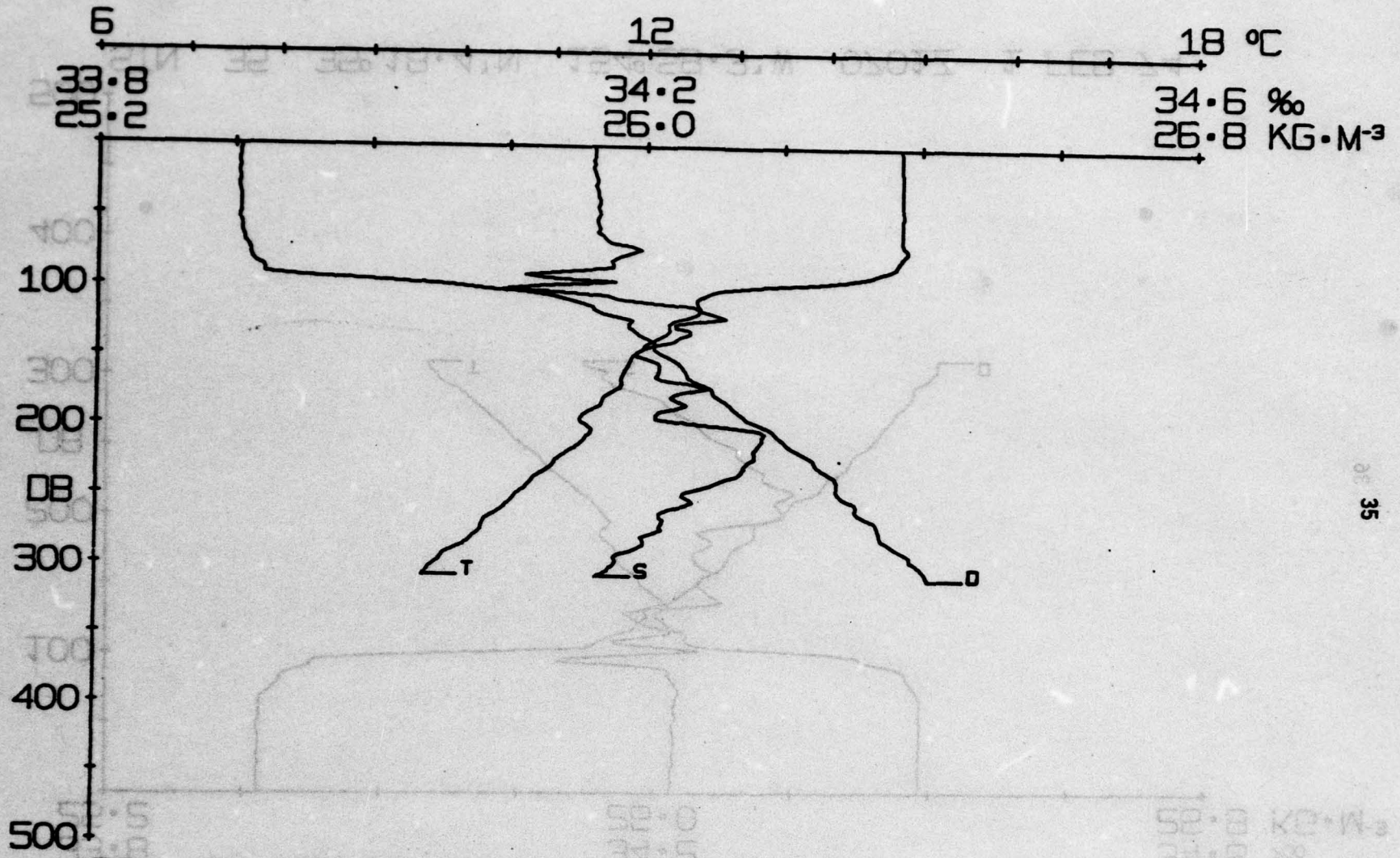

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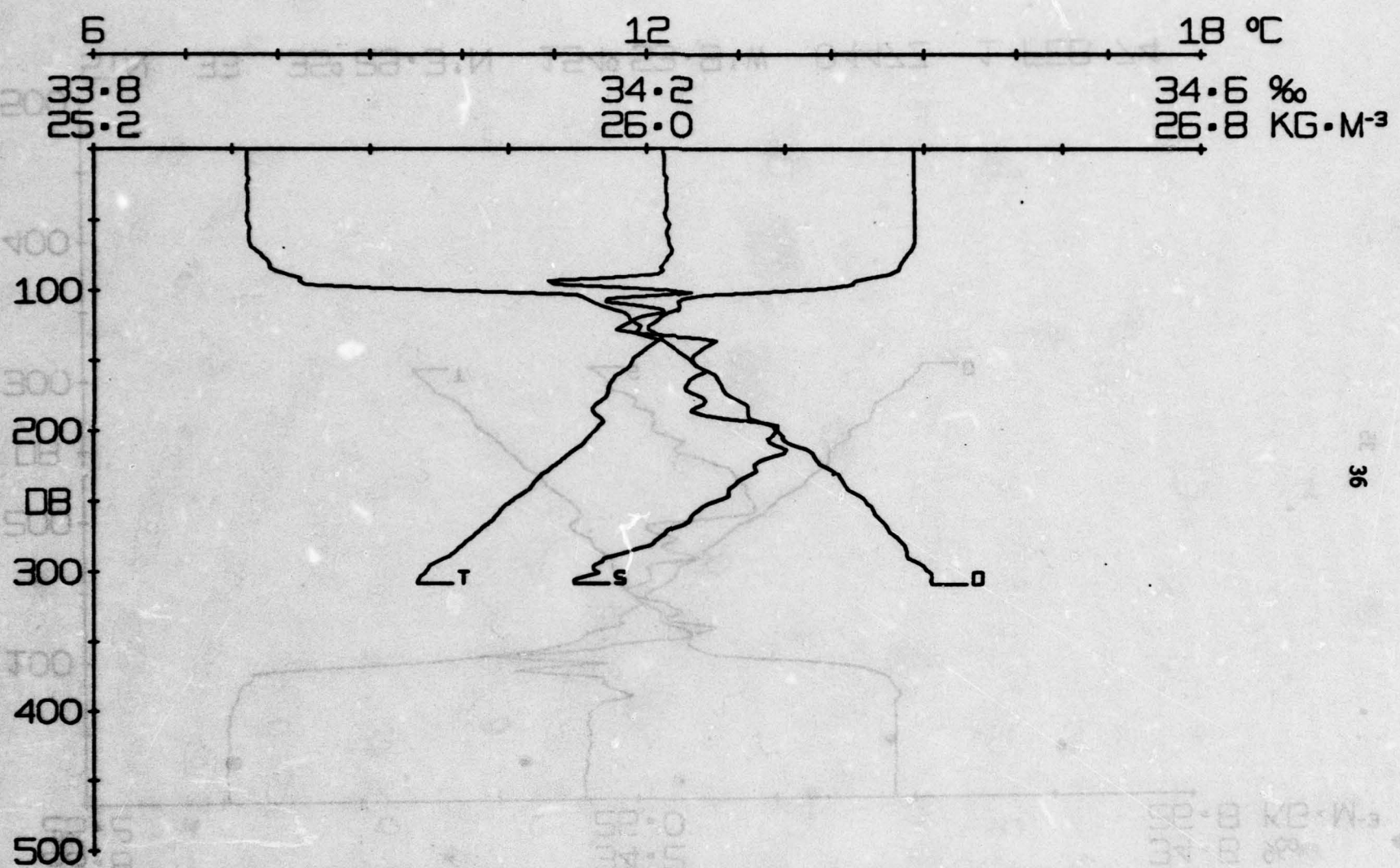

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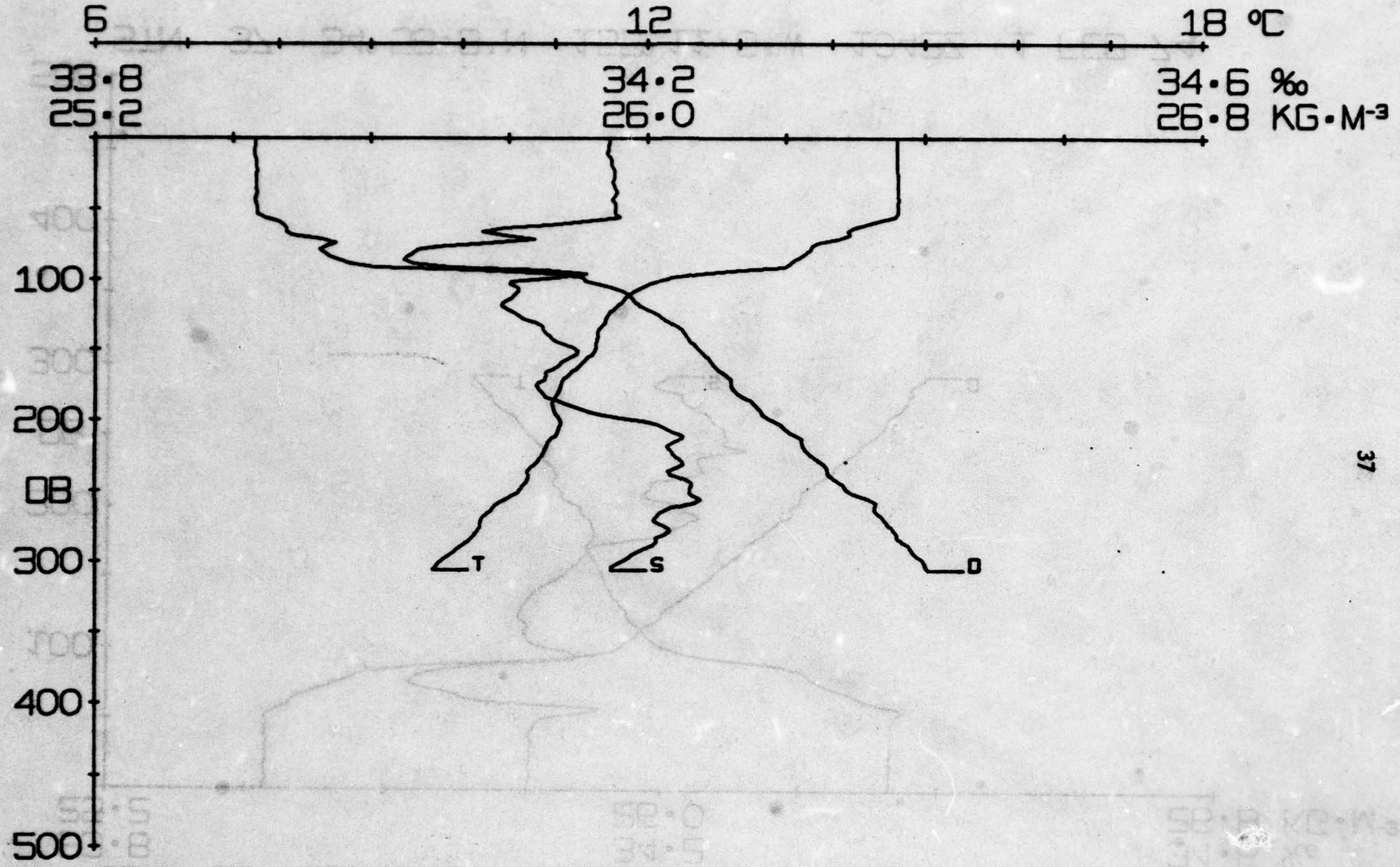

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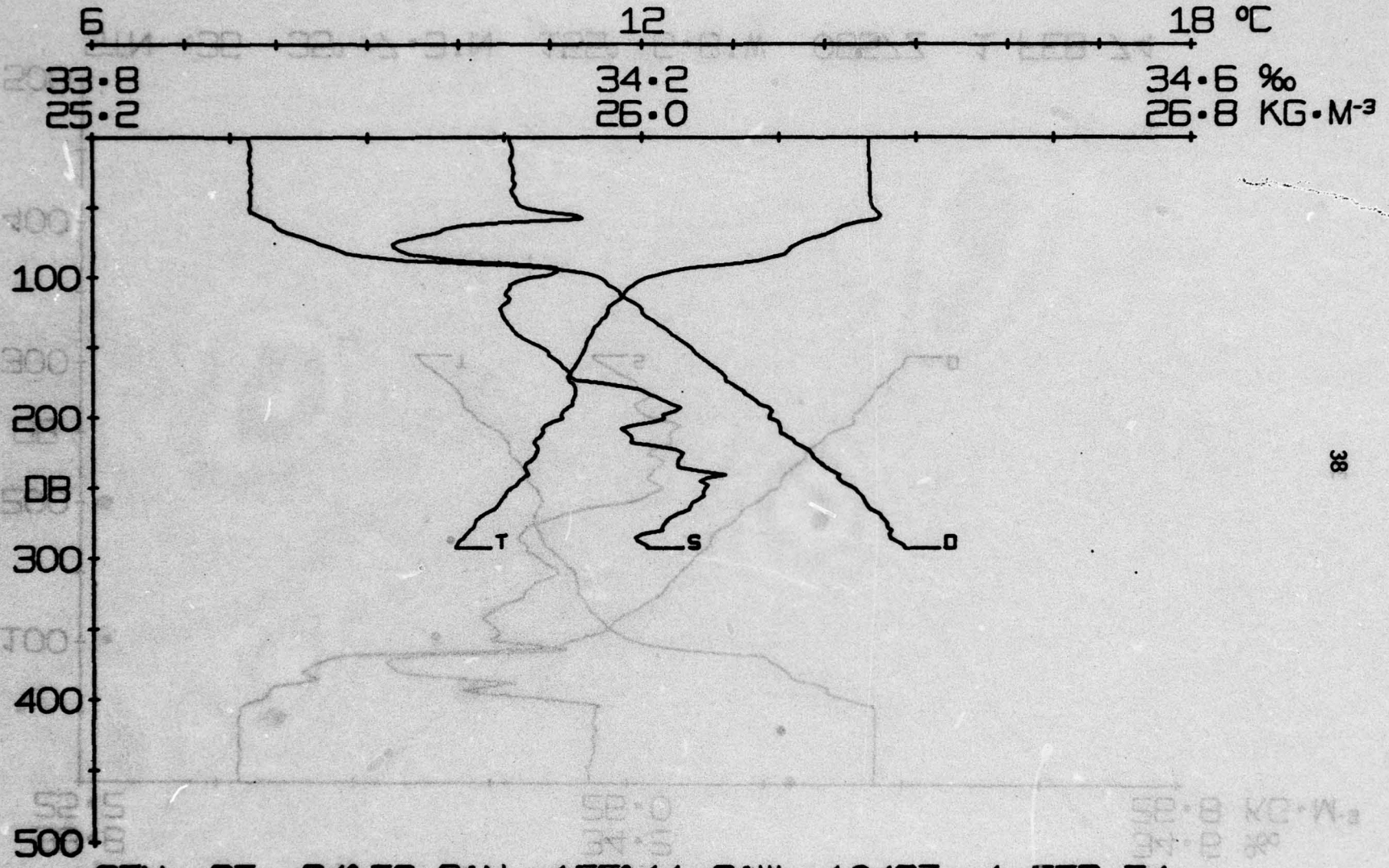
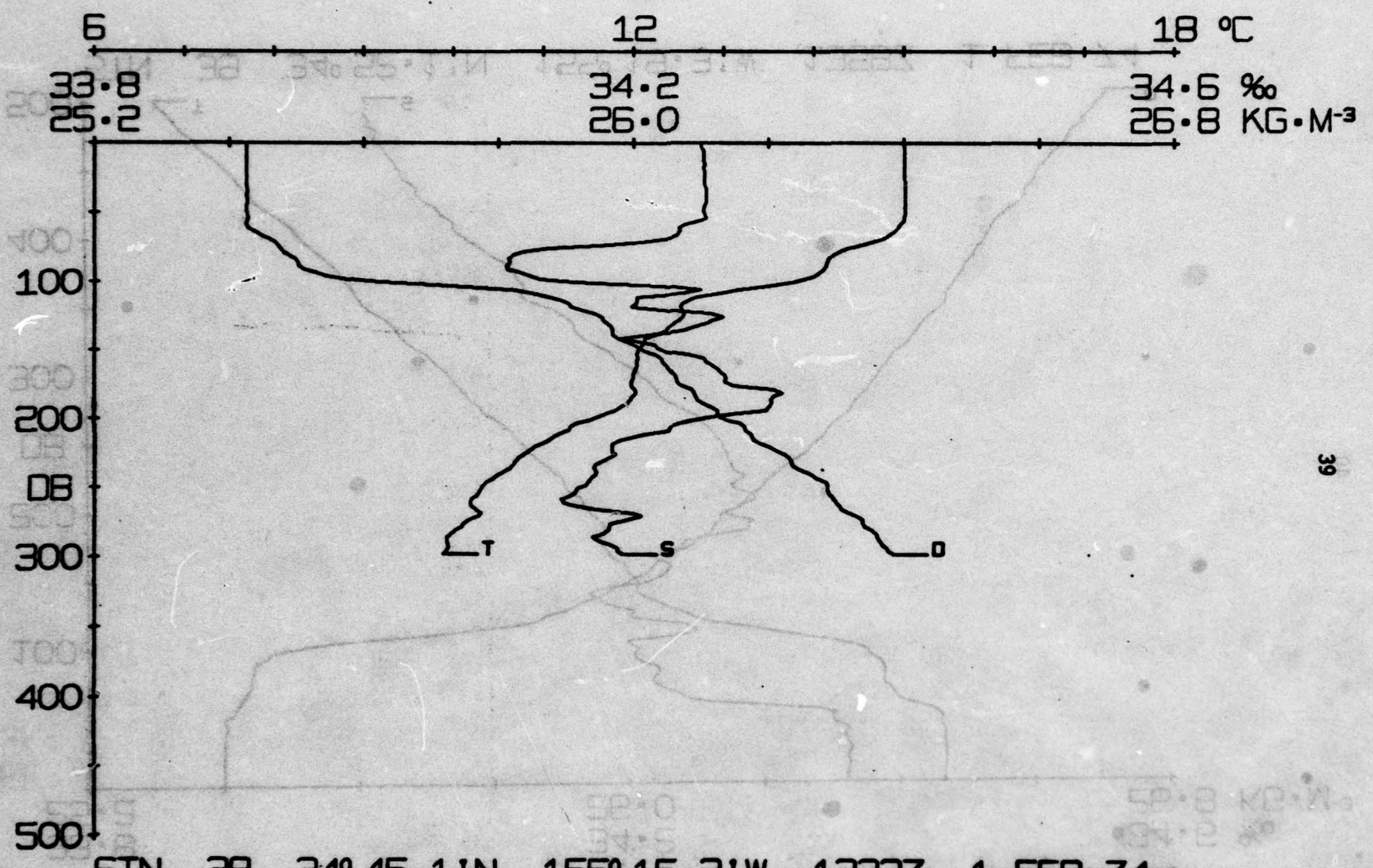
STN 36 35° 7·3'N 155° 6·8'W 0857Z 1 FEB 74

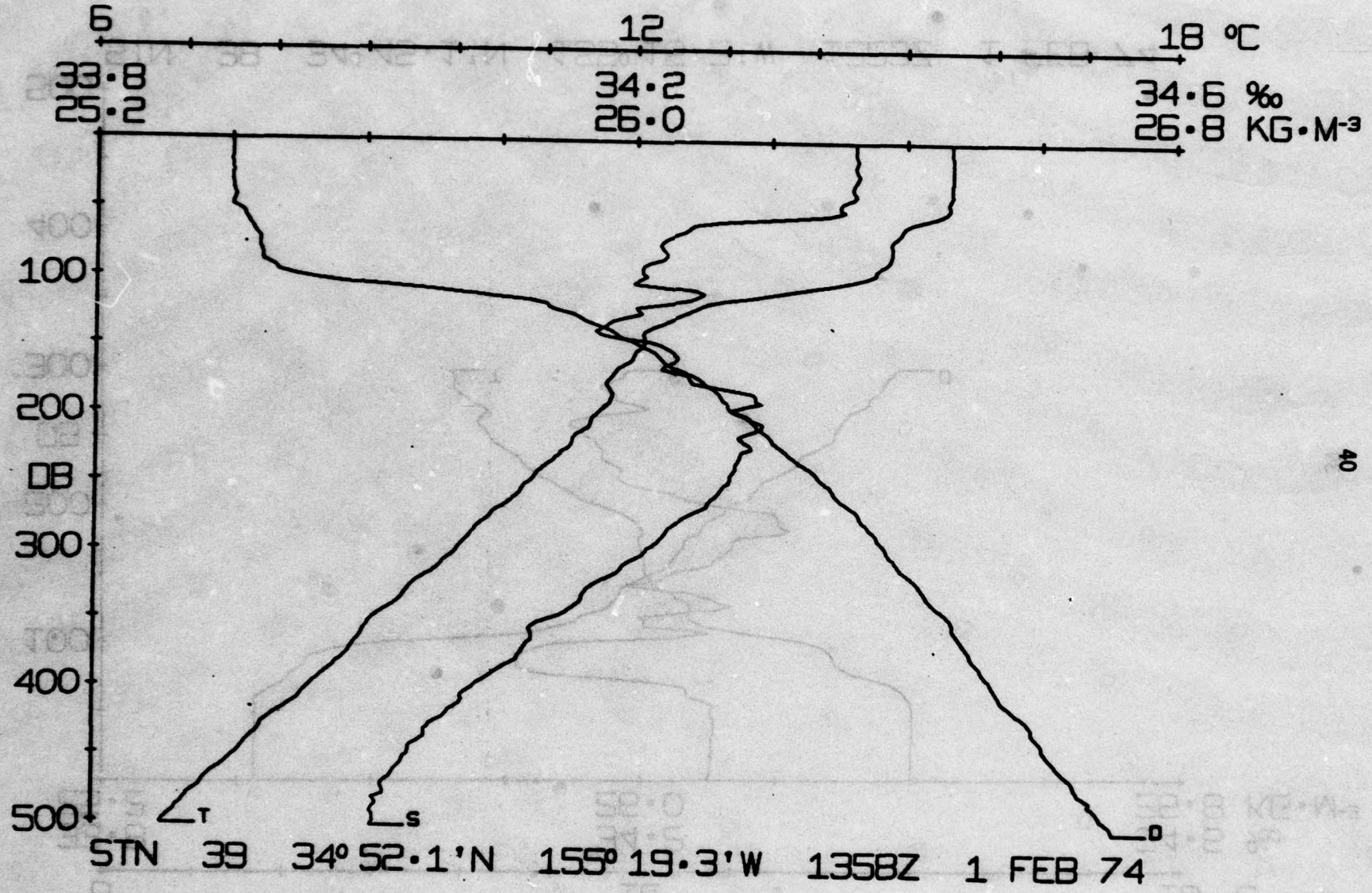


38

STN 37 34° 56·8'N 155° 11·6'W 1042Z 1 FEB 74



STN 38 34° 45·1'N 155° 15·2'W 1223Z 1 FEB 74


6
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18 °C
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26·0
34·6 ‰
26·8 KG·M⁻³
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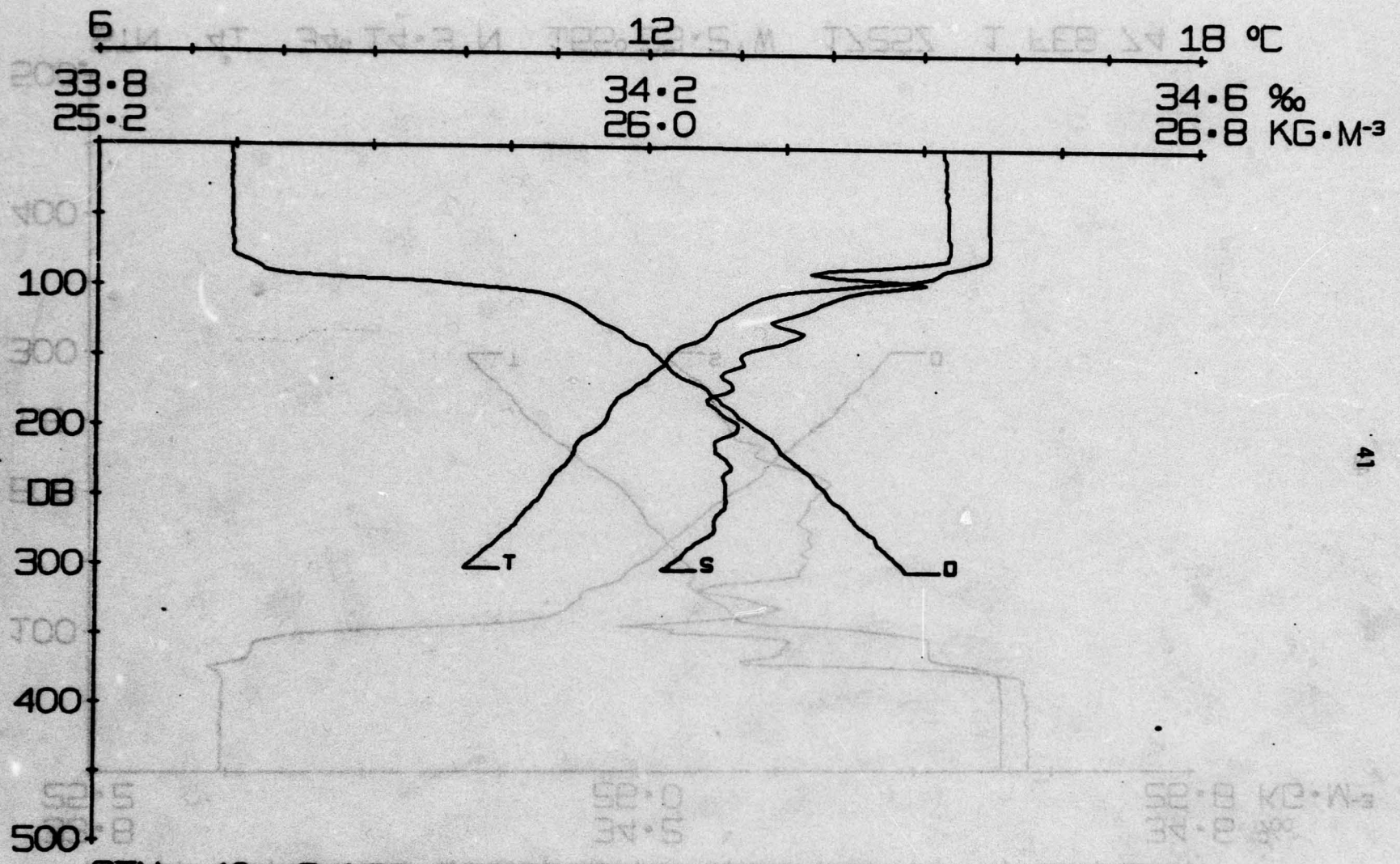
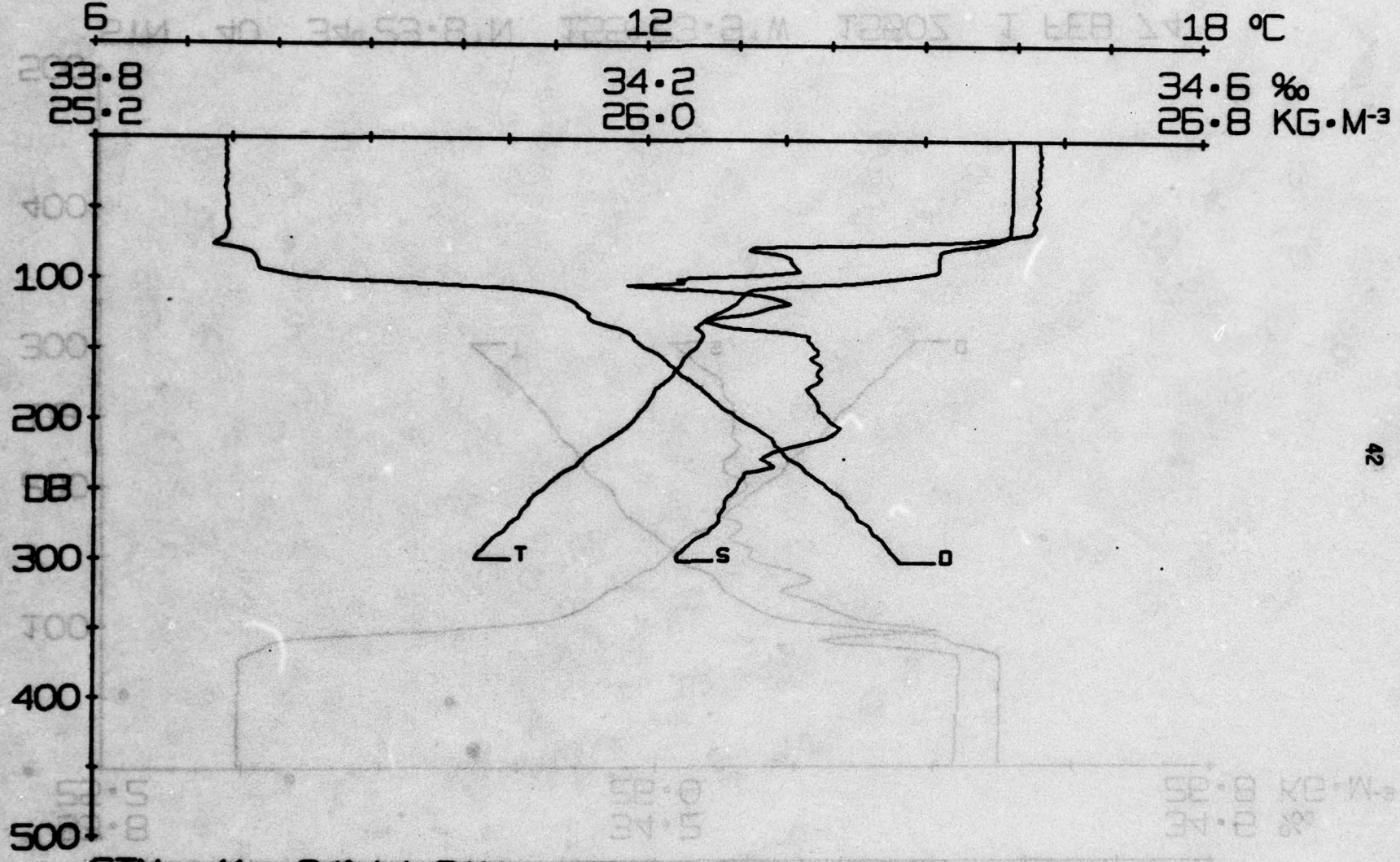
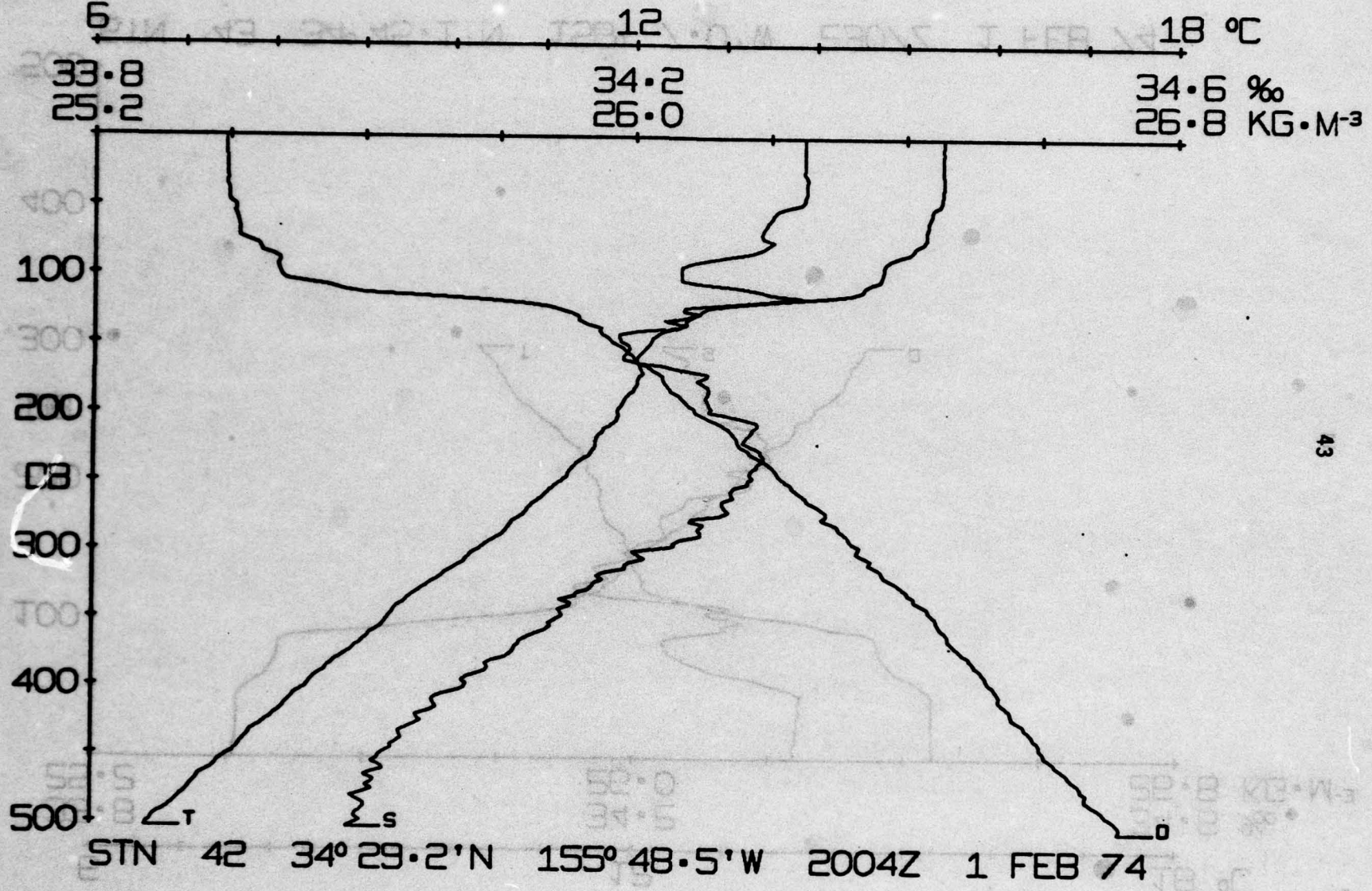
D
STN 39 34° 52·1'N 155° 19·3'W 1358Z 1 FEB 74



STN 40 34° 23·8'N 155° 23·9'W 1550Z 1 FEB 74



STN 41 34° 14·3'N 155° 29·2'W 1725Z 1 FEB 74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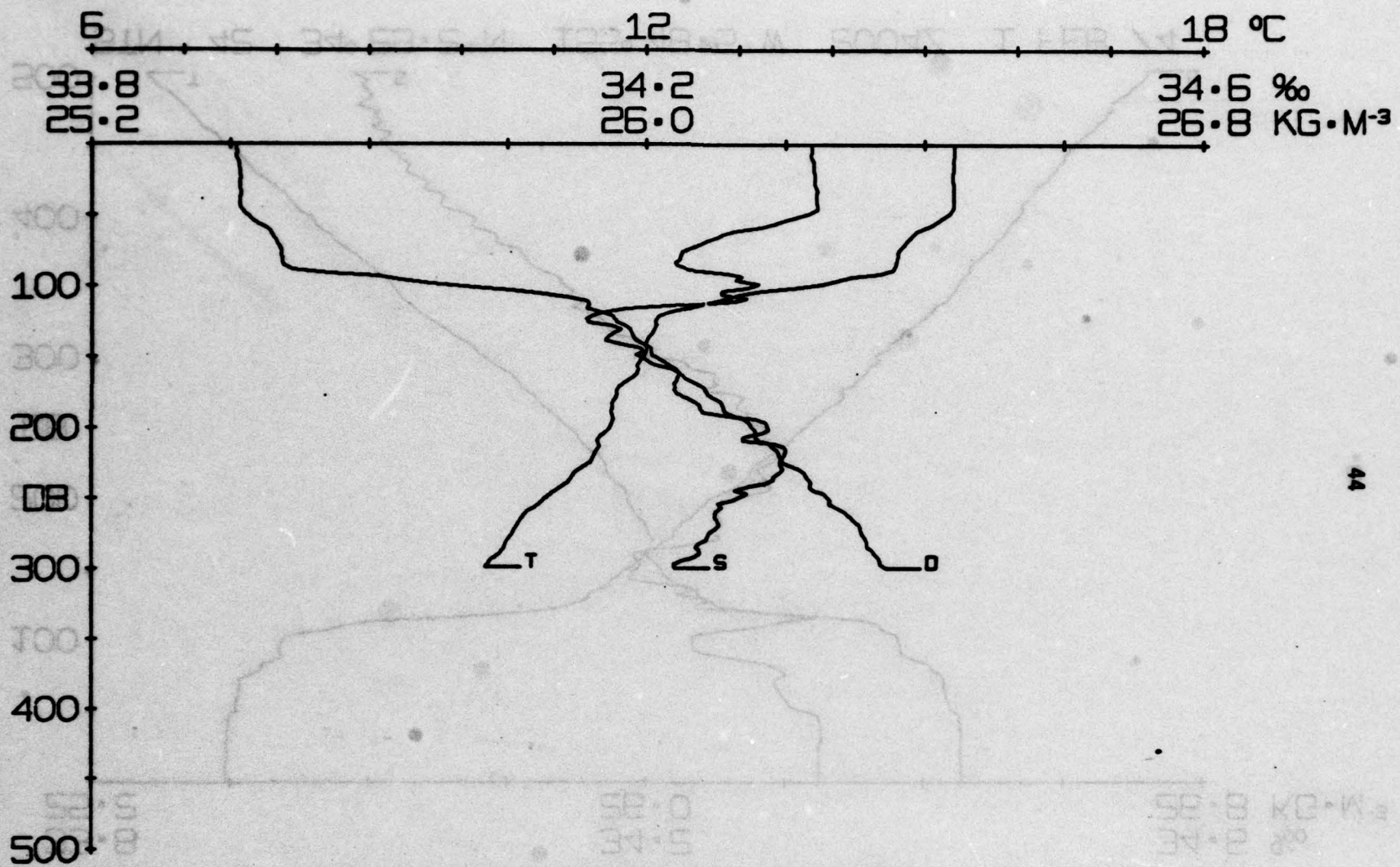
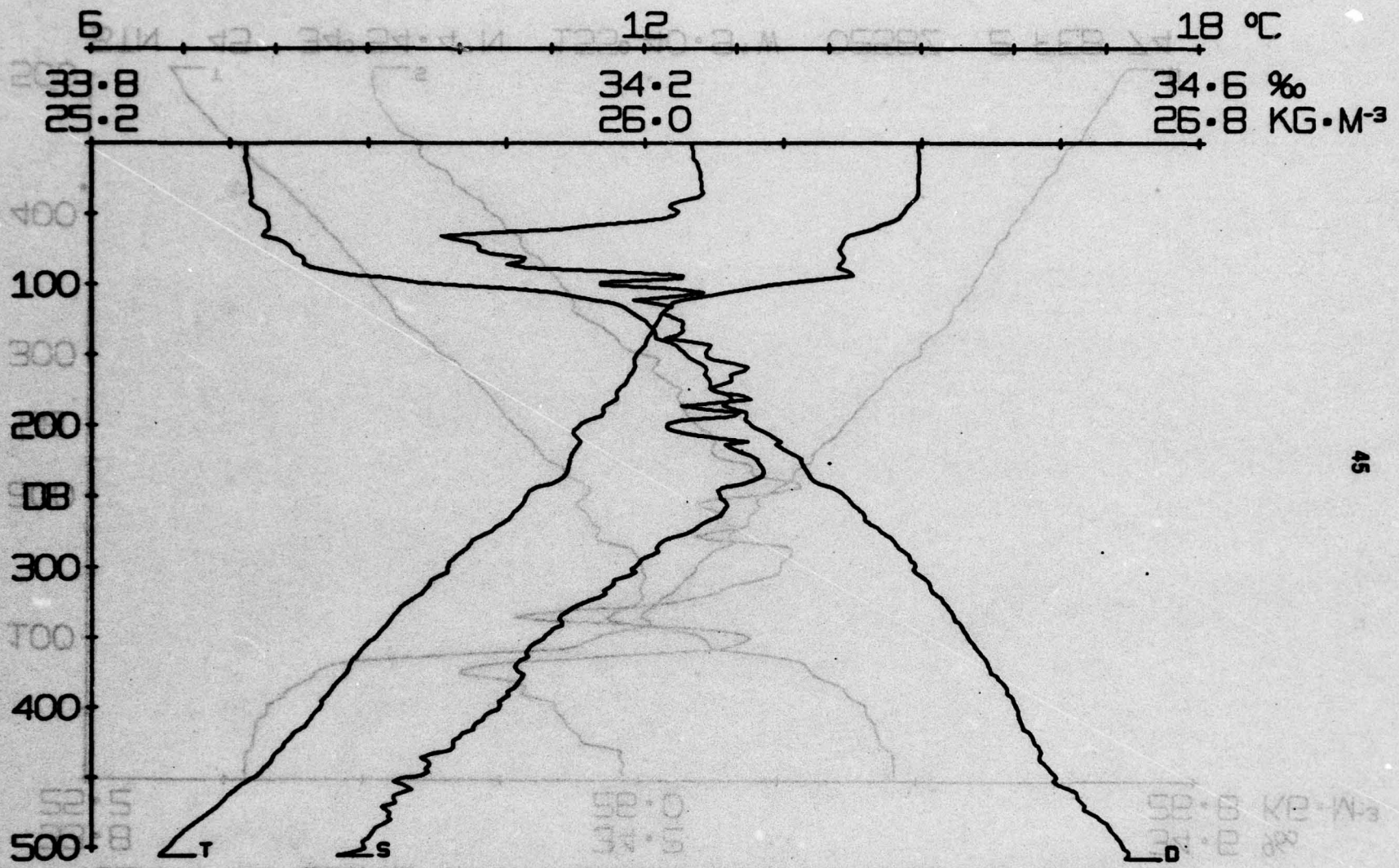
O
STN 42 34° 29·2'N 155° 48·5'W 2004Z 1 FEB 74



STN 43 34° 45·1'N 156° 7·0'W 2307Z 1 FEB 74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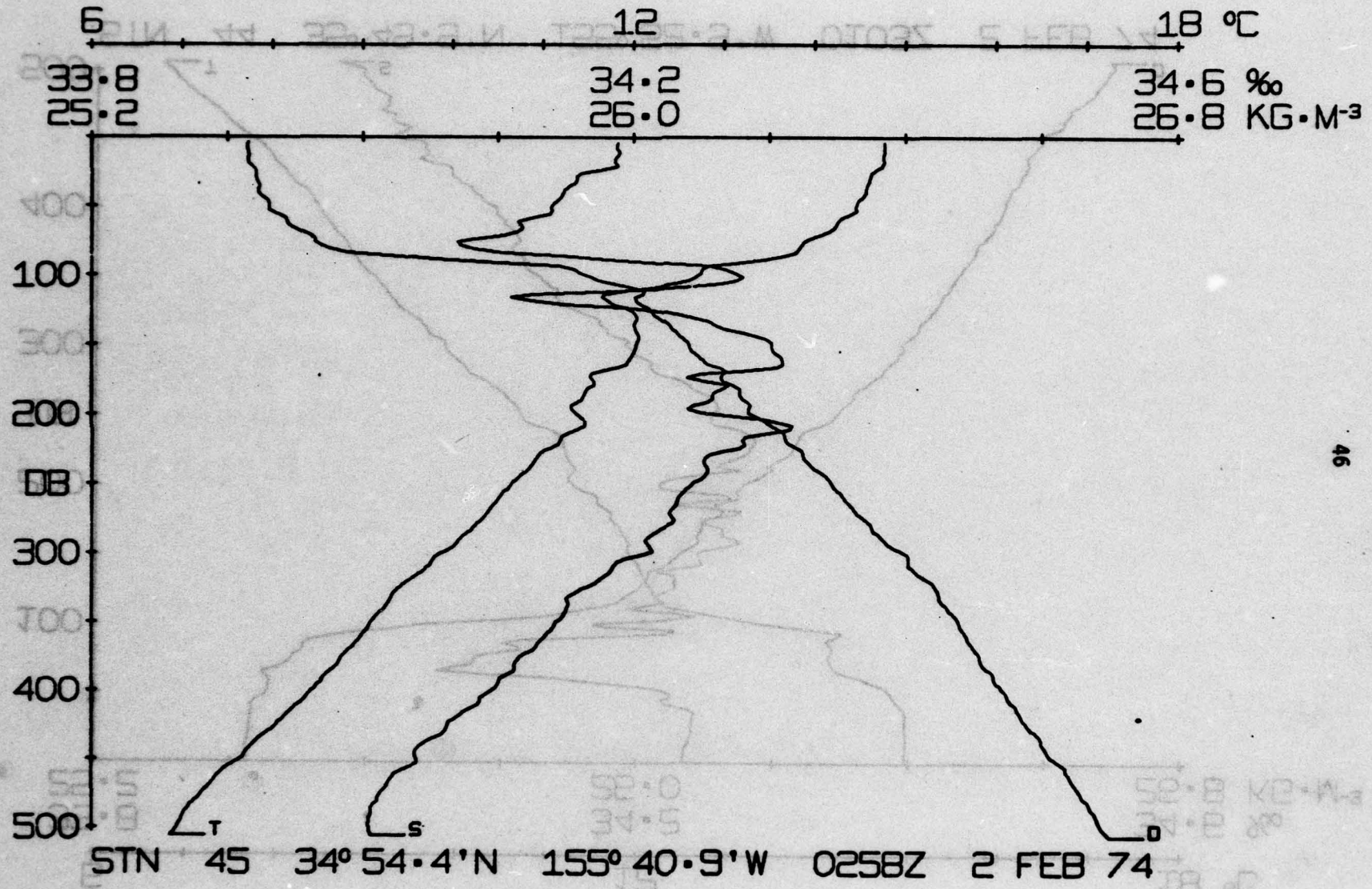
STN 44 35° 49·9'N 155° 52·9'W 0103Z 2 FEB 74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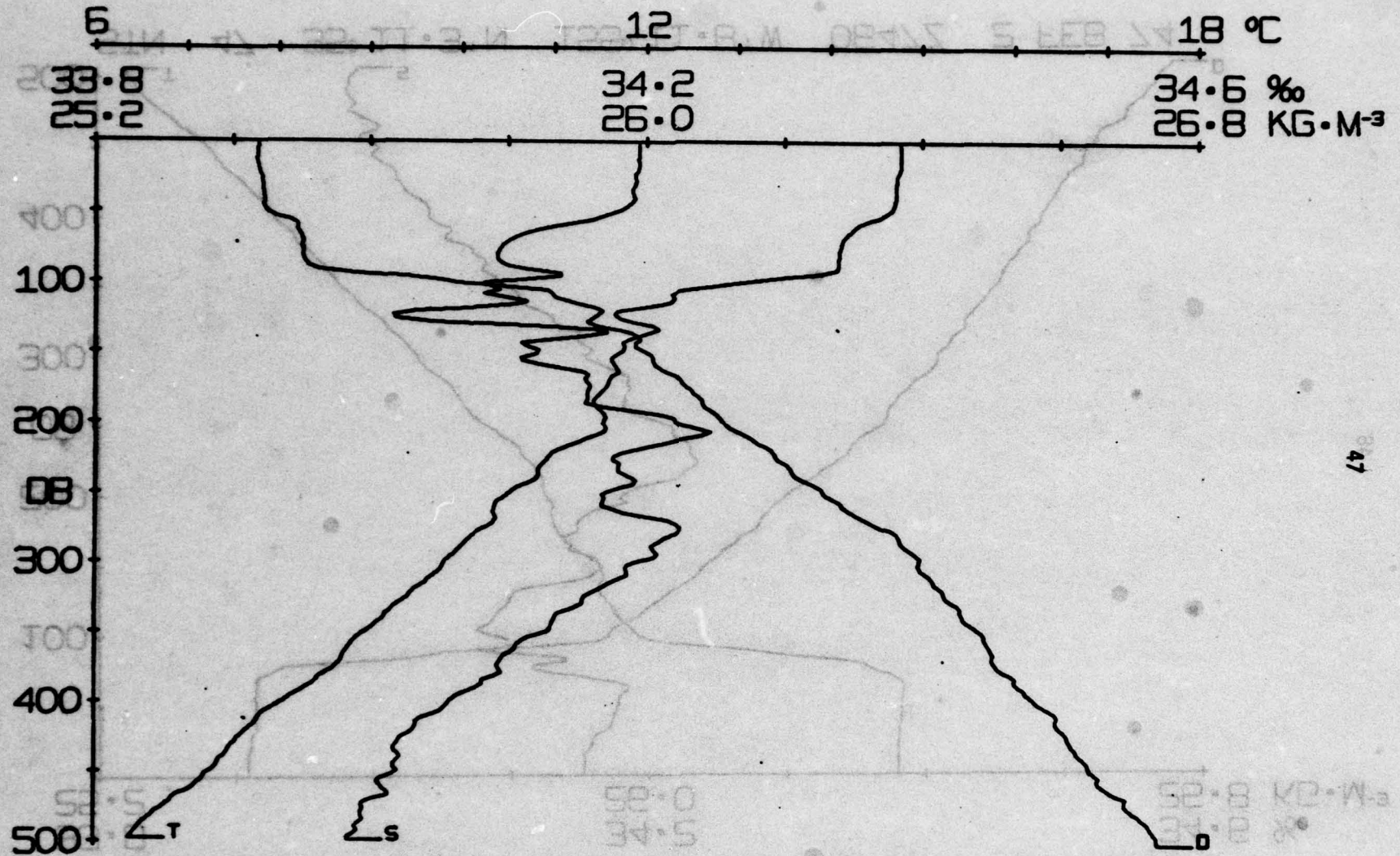
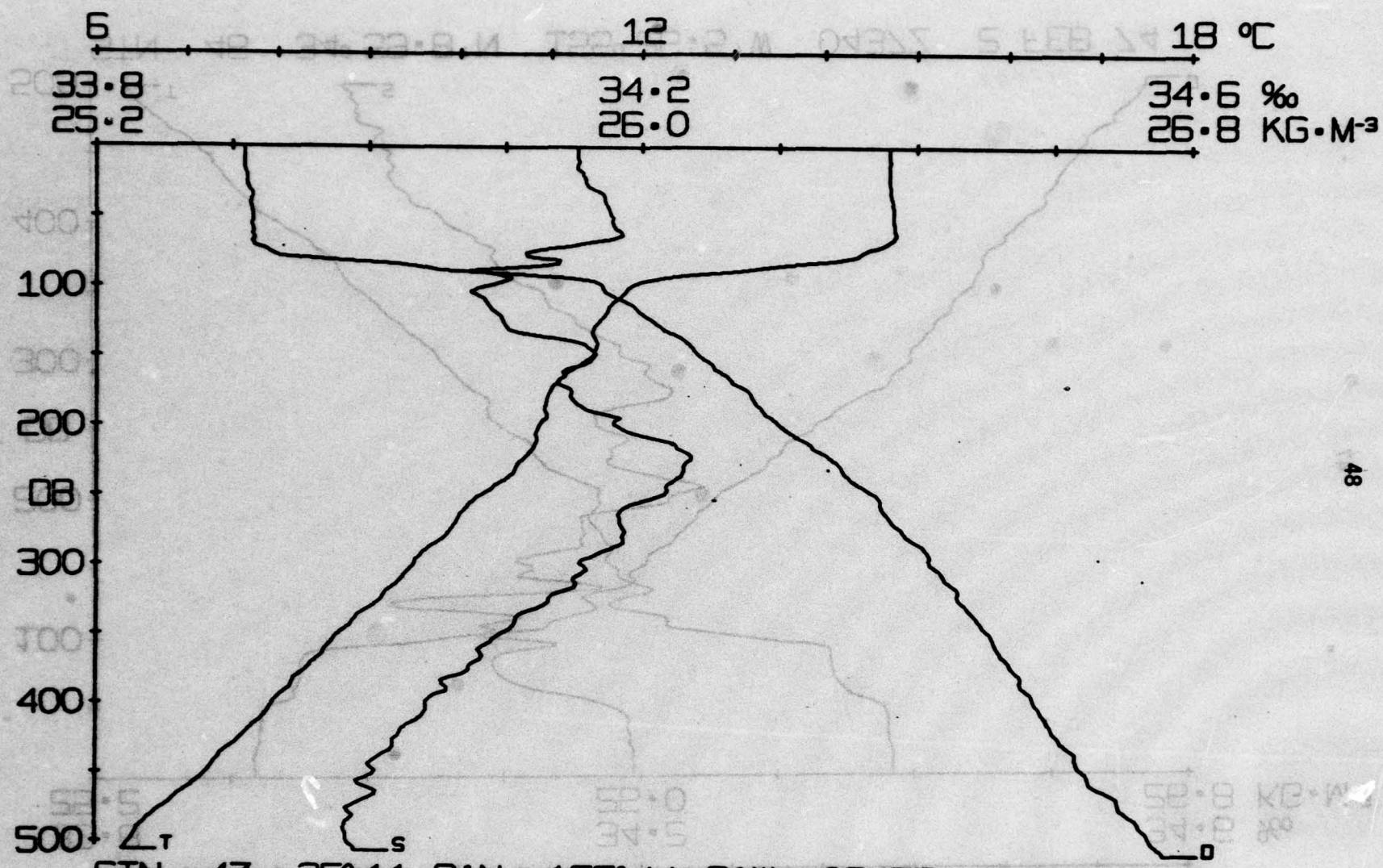


STN 46 34° 59·8'N 155° 26·5'W 0437Z 2 FEB 74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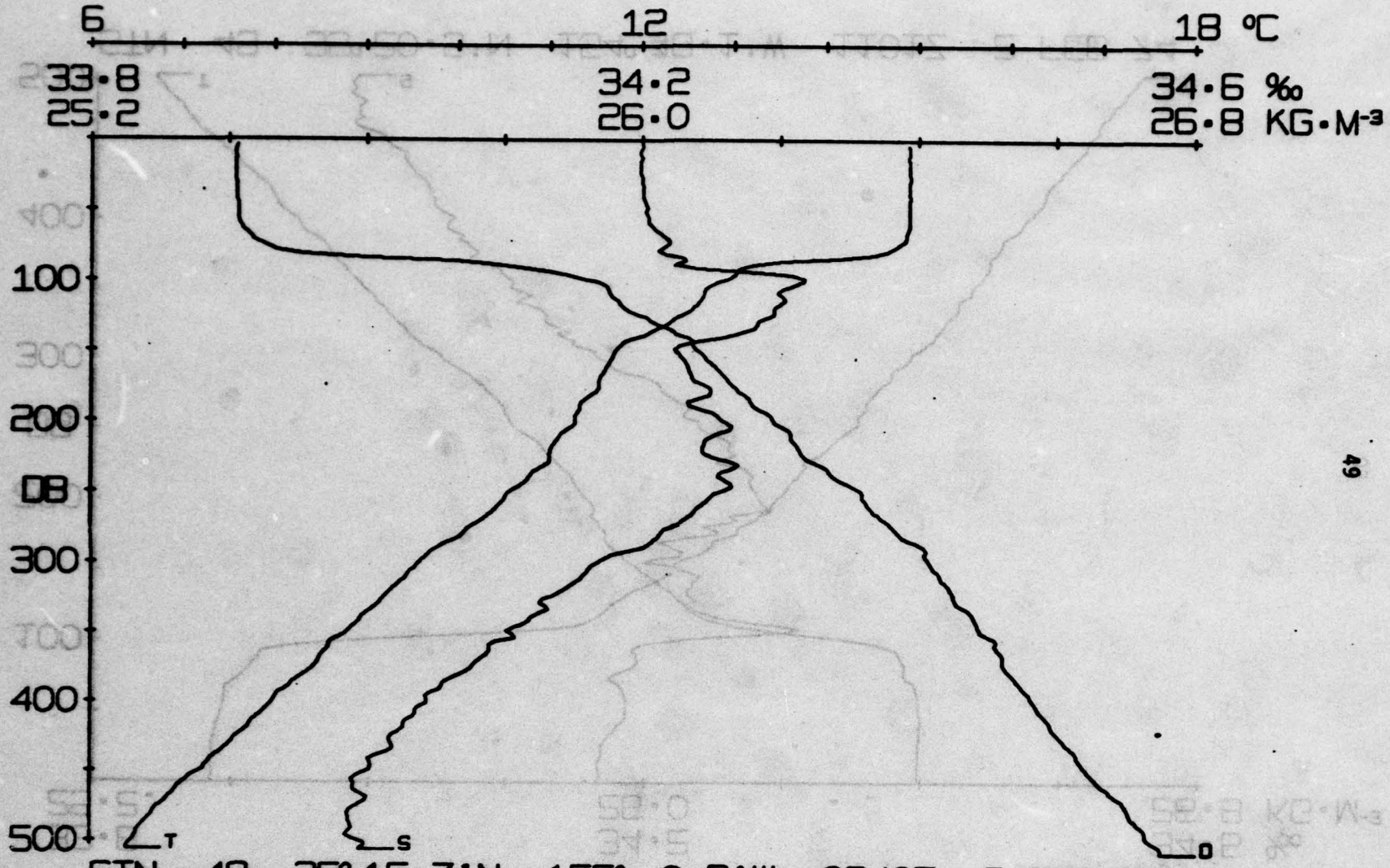
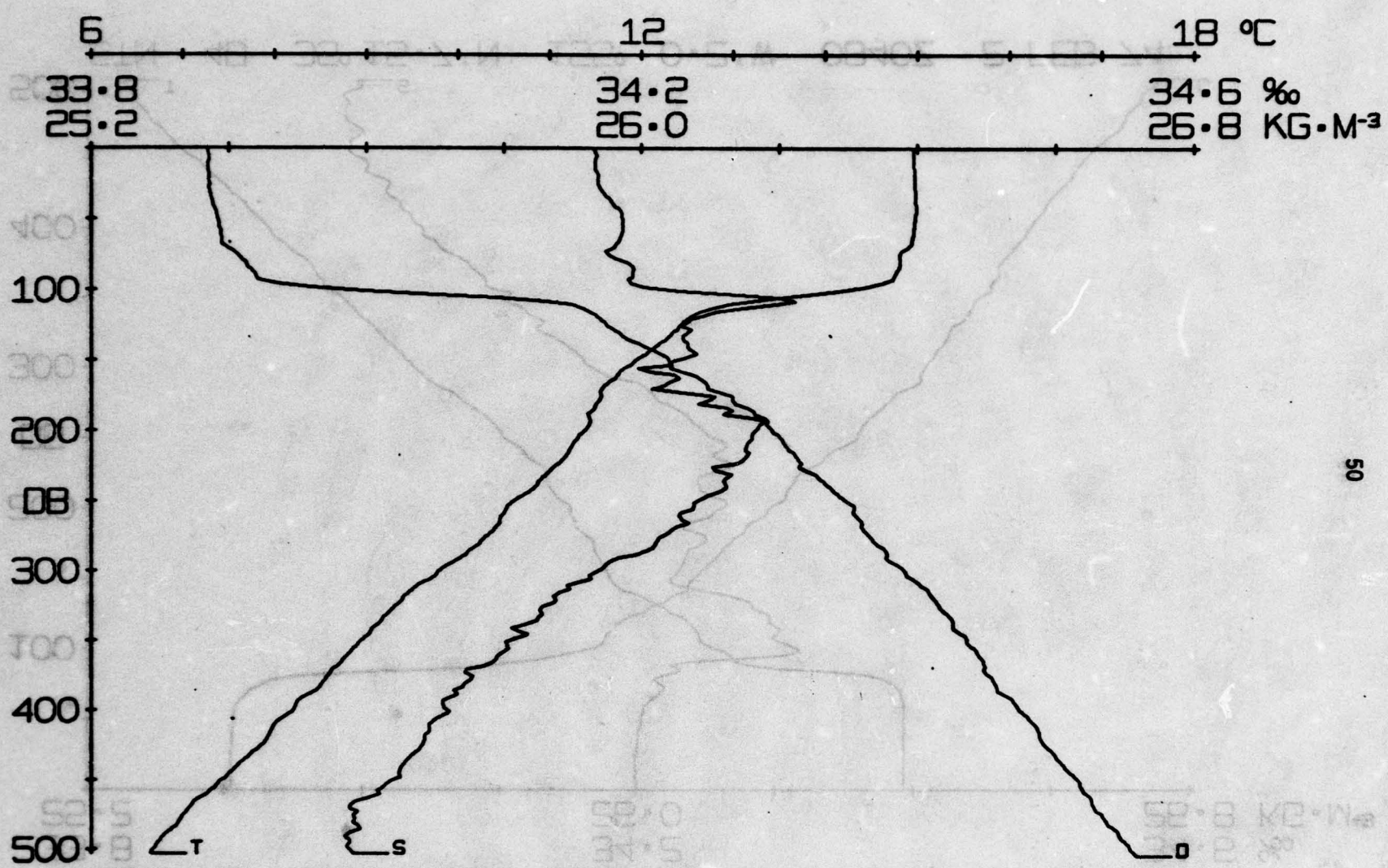
STN 47 35° 11·3'N 155° 11·8'W 0647Z 2 FEB 74



STN 48 35° 15·7'N 155° 0·2'W 0840Z 2 FEB 74.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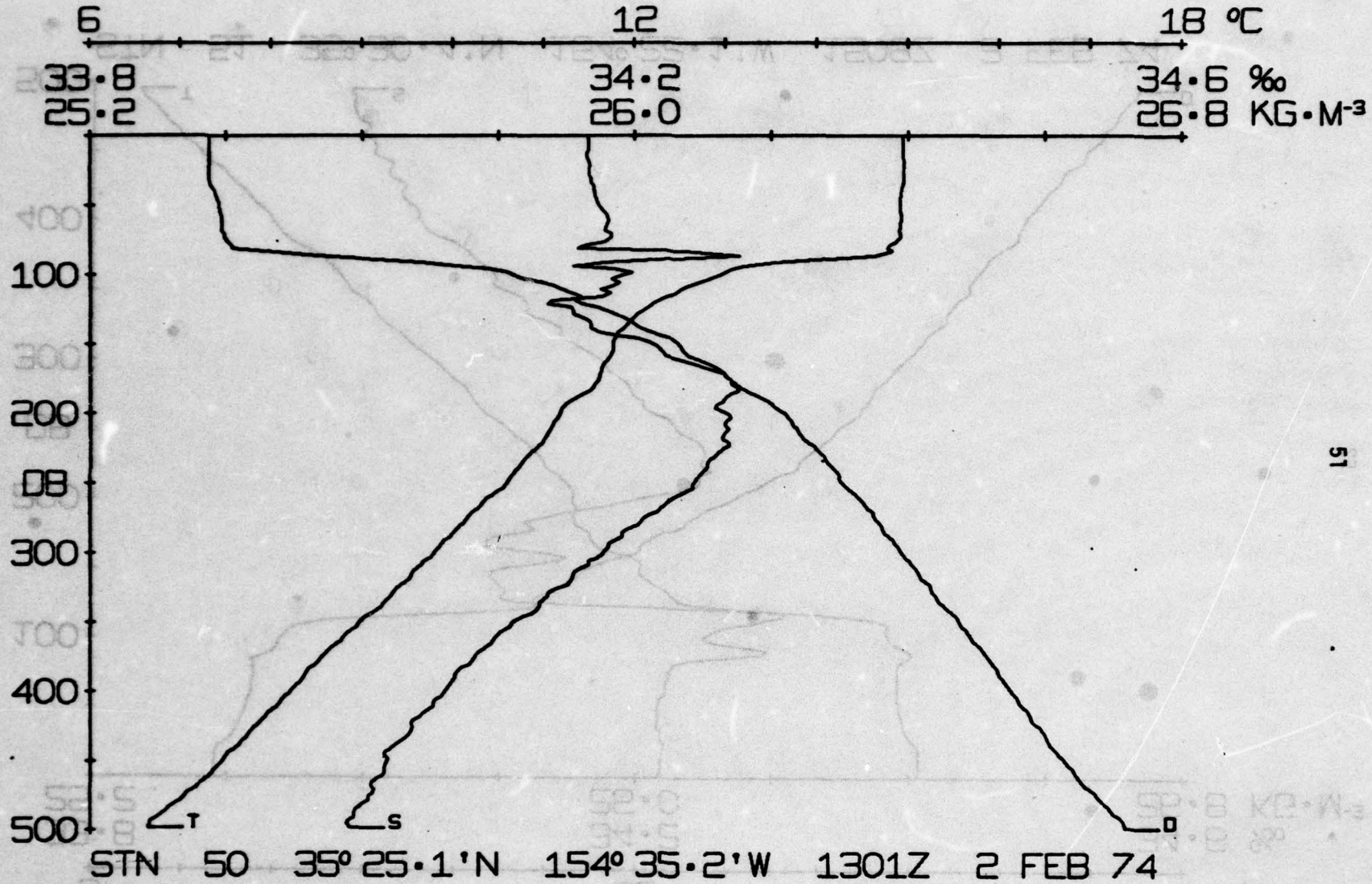
50
STN 49 35° 20·5'N 154° 48·1'W 1101Z 2 FEB 74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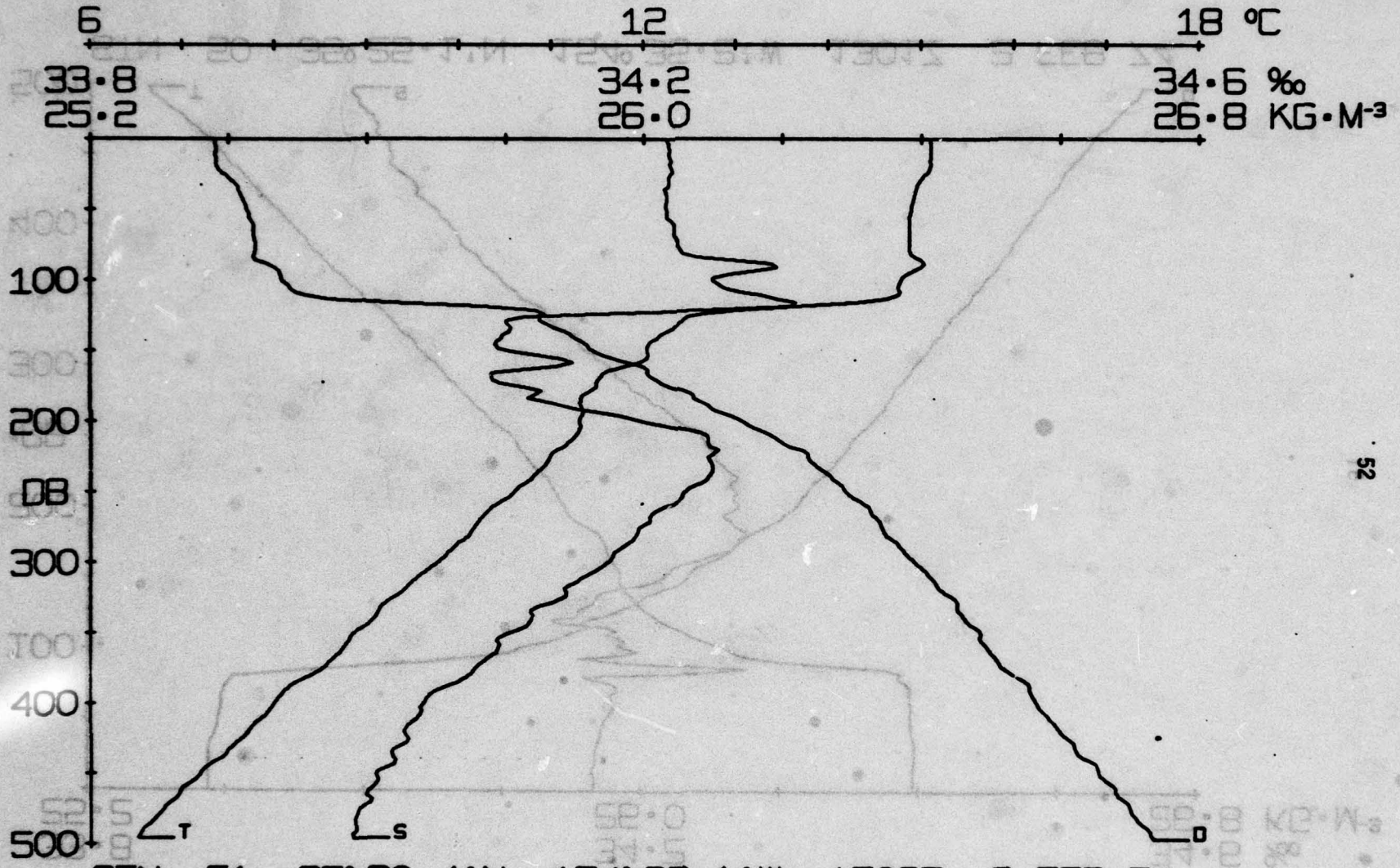
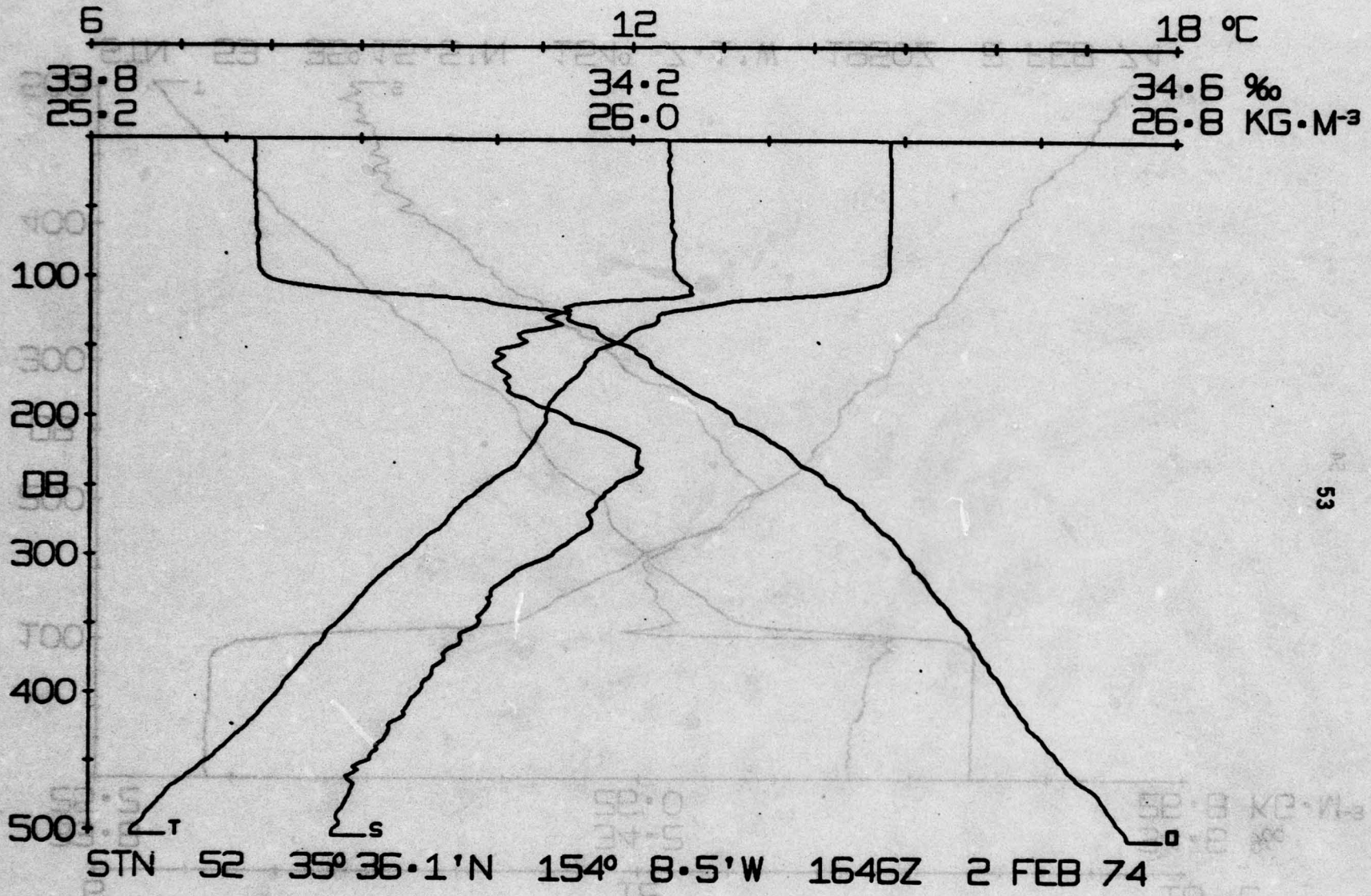


STN 51 35° 30·4'N 154° 22·1'W 1508Z 2 FEB 74

52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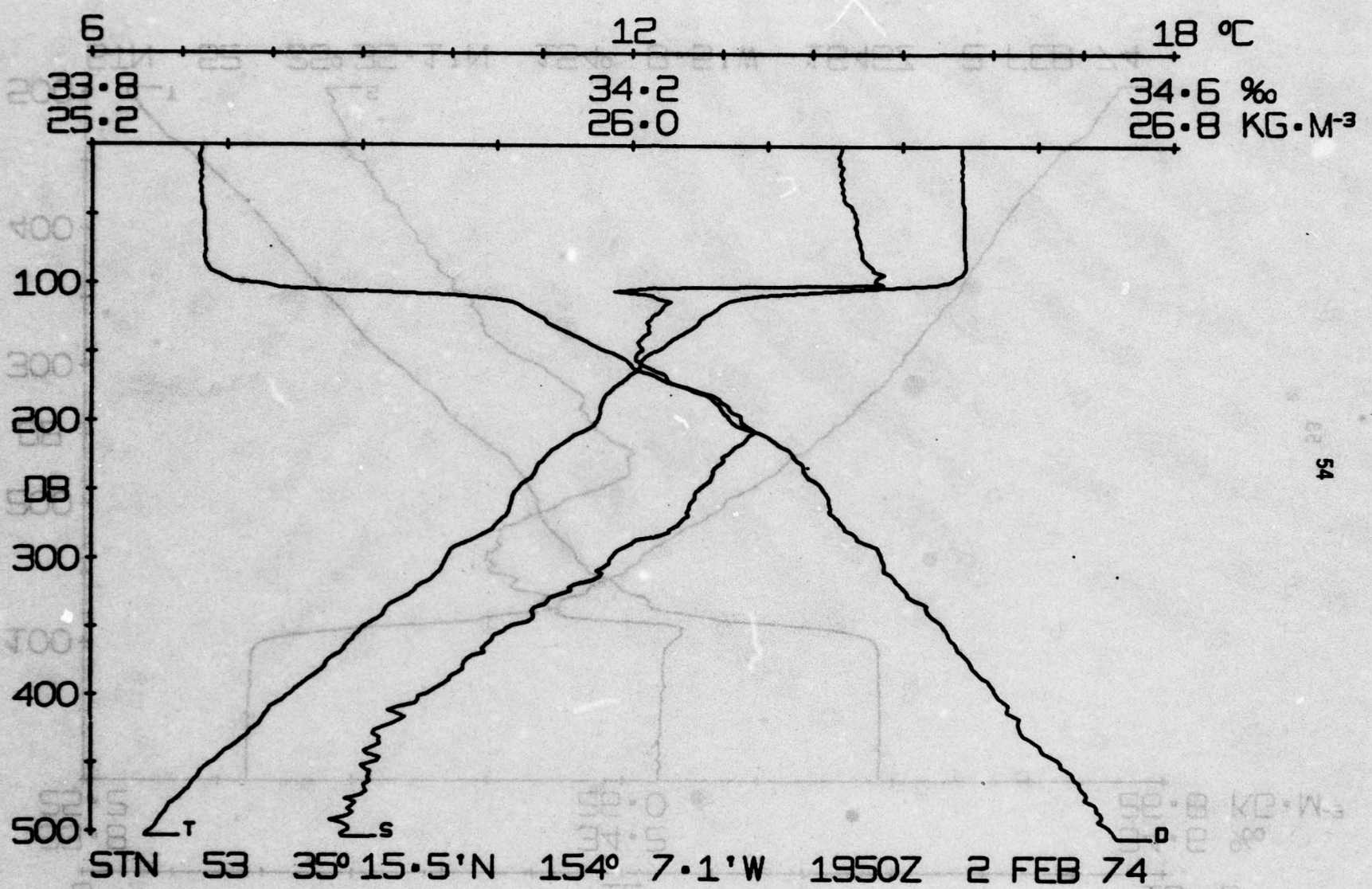
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26·0
26·8 KG·M⁻³
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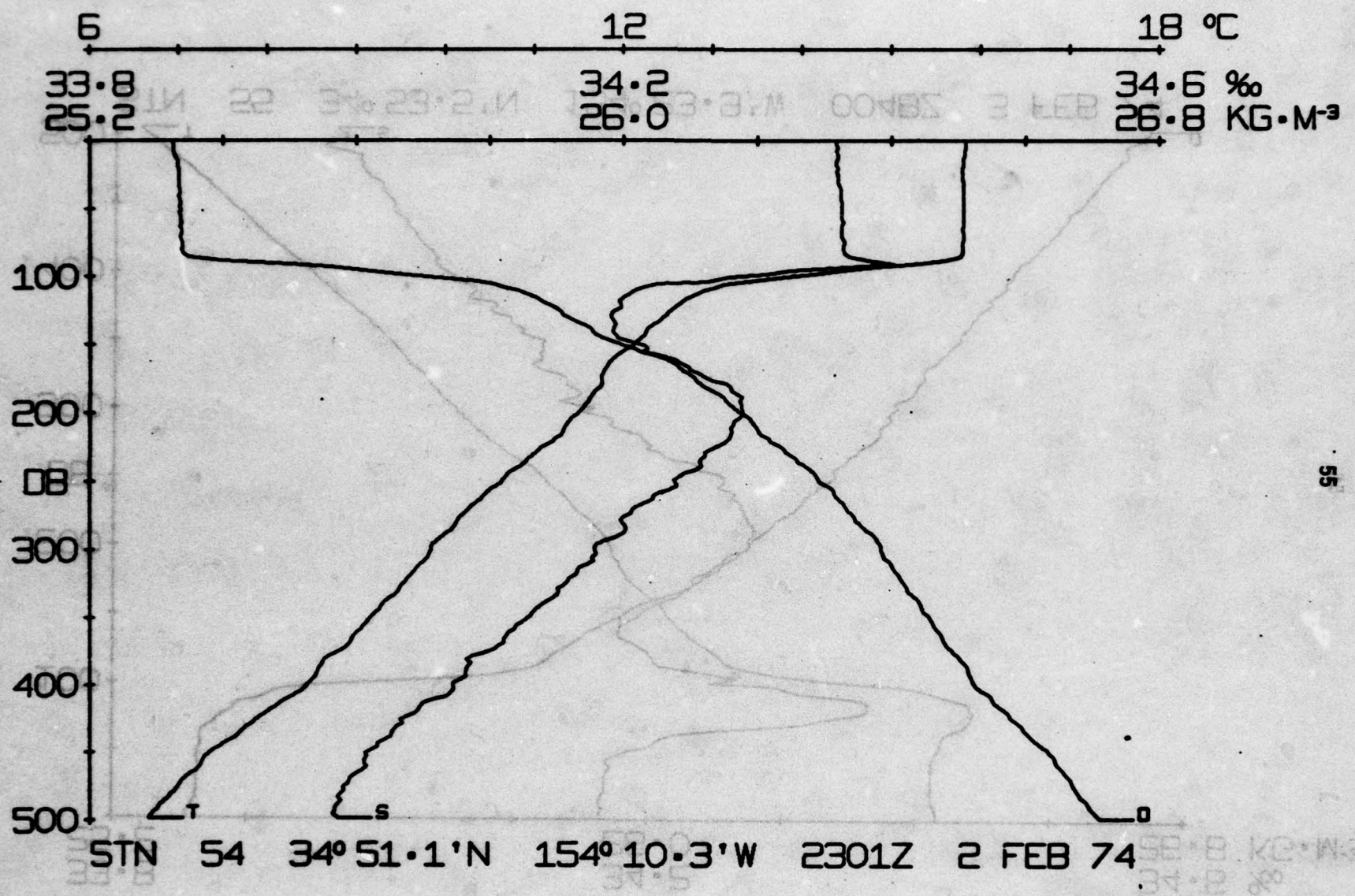
STN 53 35° 15·5'N 154° 7·1'W 1950Z 2 FEB 74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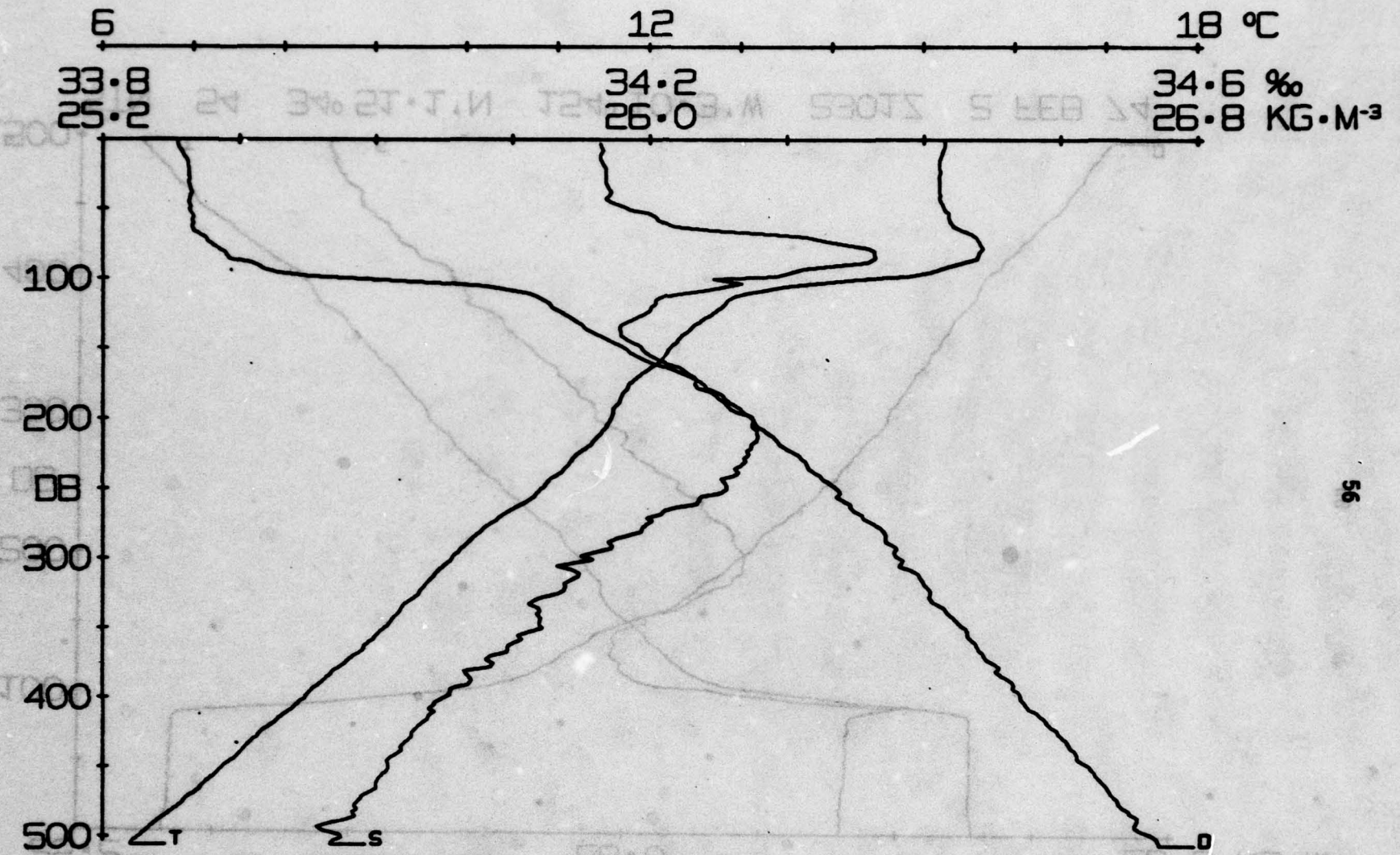
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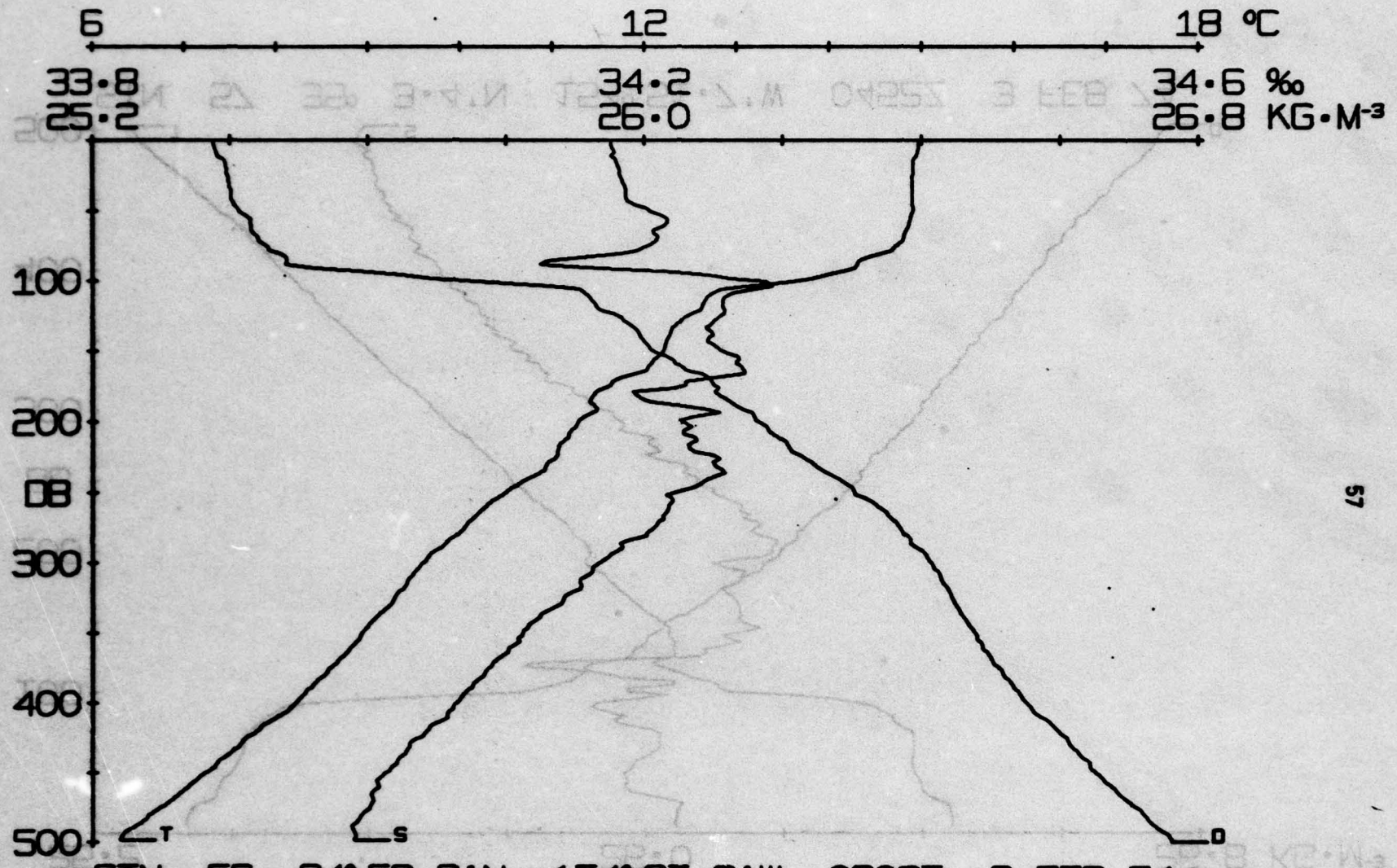
STN 55 34° 53·5'N 154° 23·9'W 0048Z 3 FEB 74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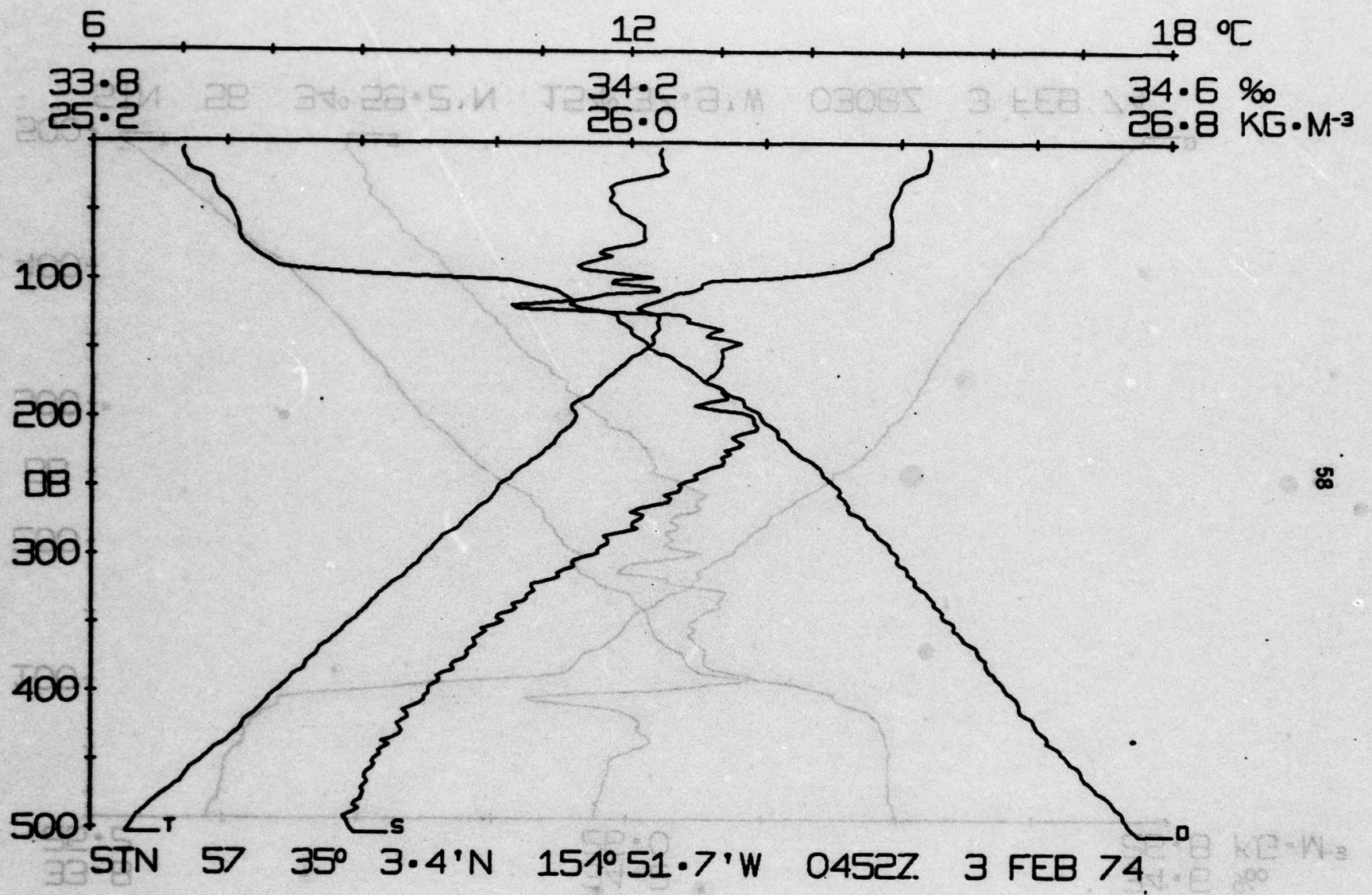
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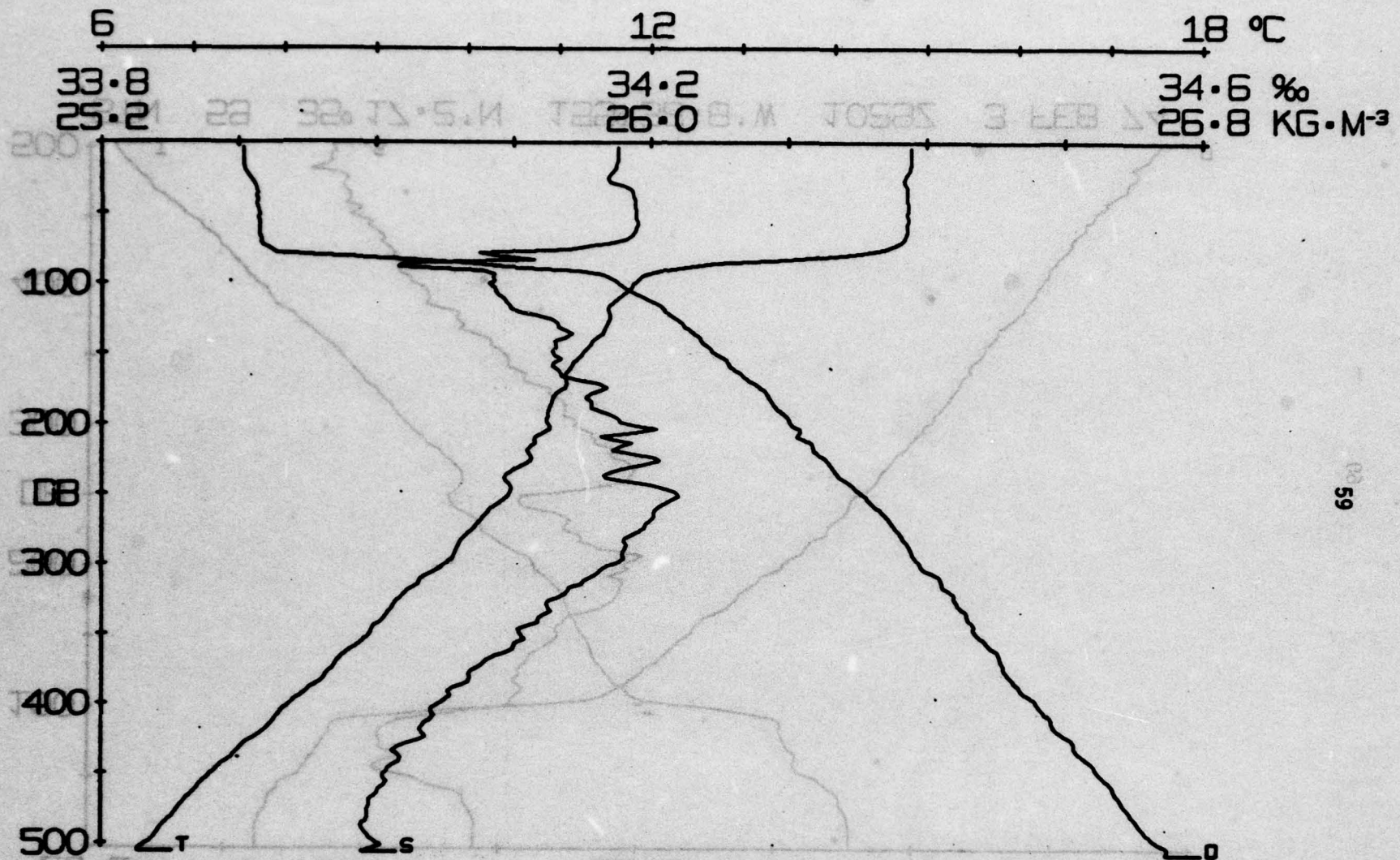
STN 57 35° 3·4'N 151° 51·7'W 0452Z. 3 FEB 74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D
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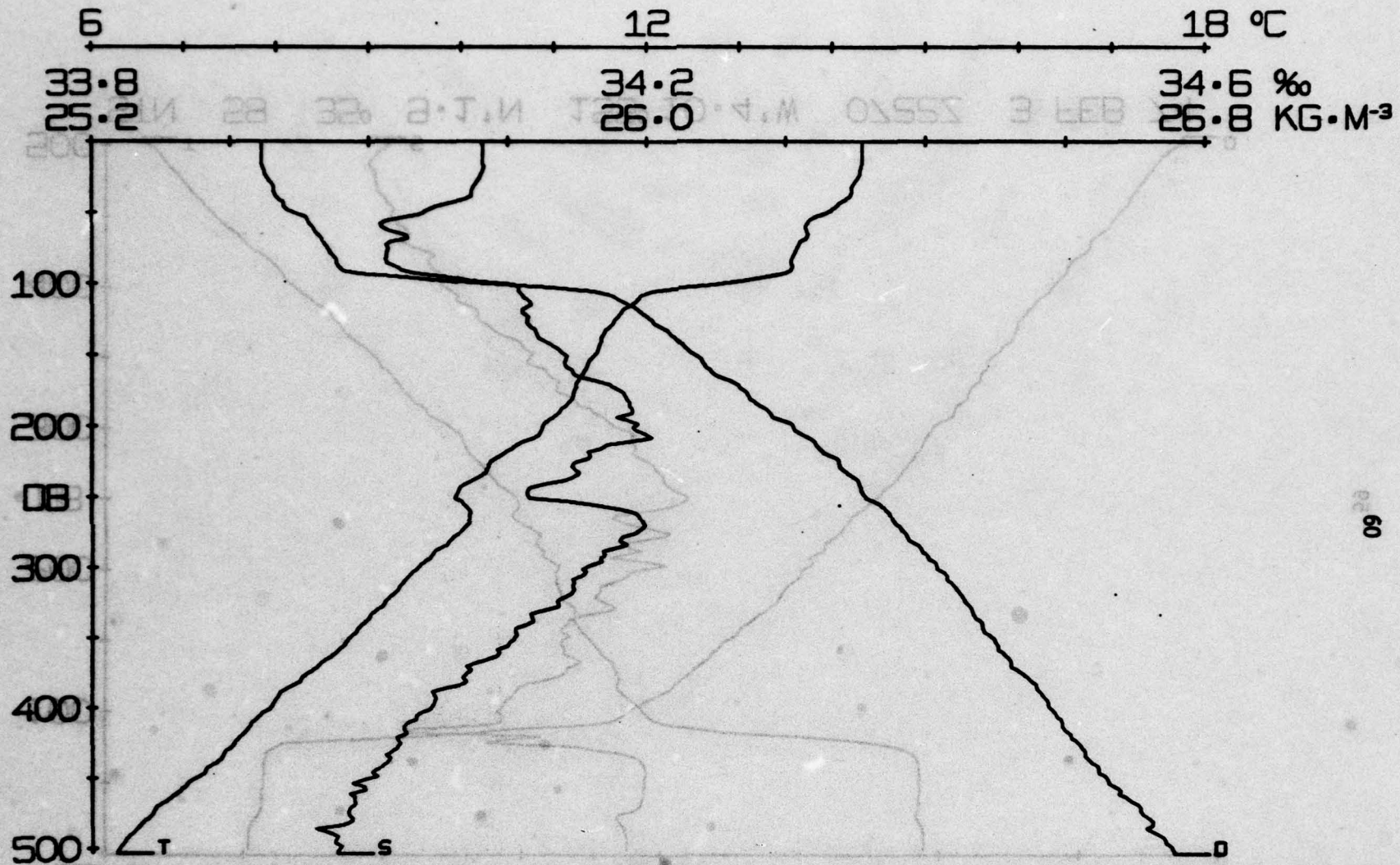

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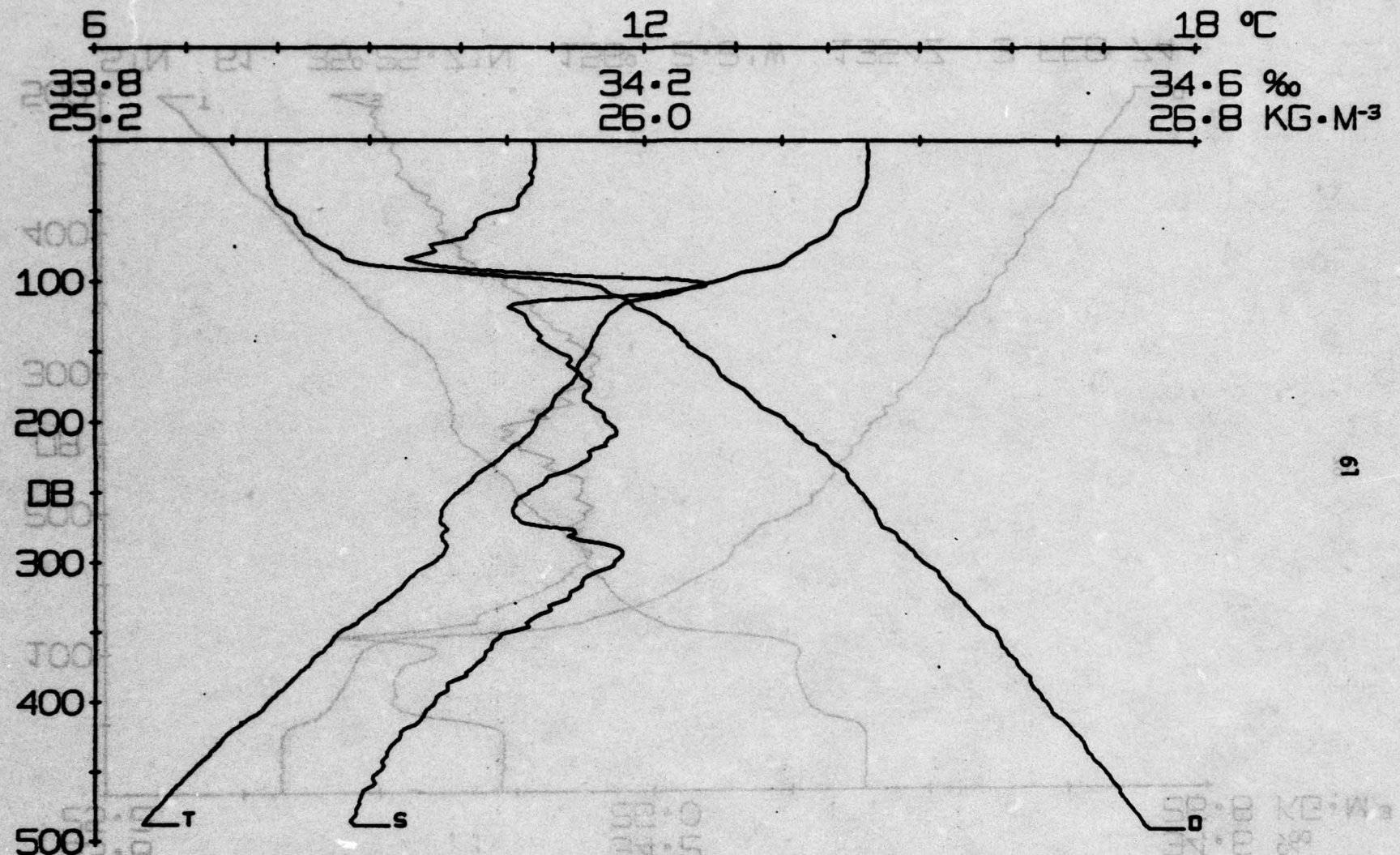
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18 °C
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34·6 ‰
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26·0
26·8 KG·M⁻³
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D
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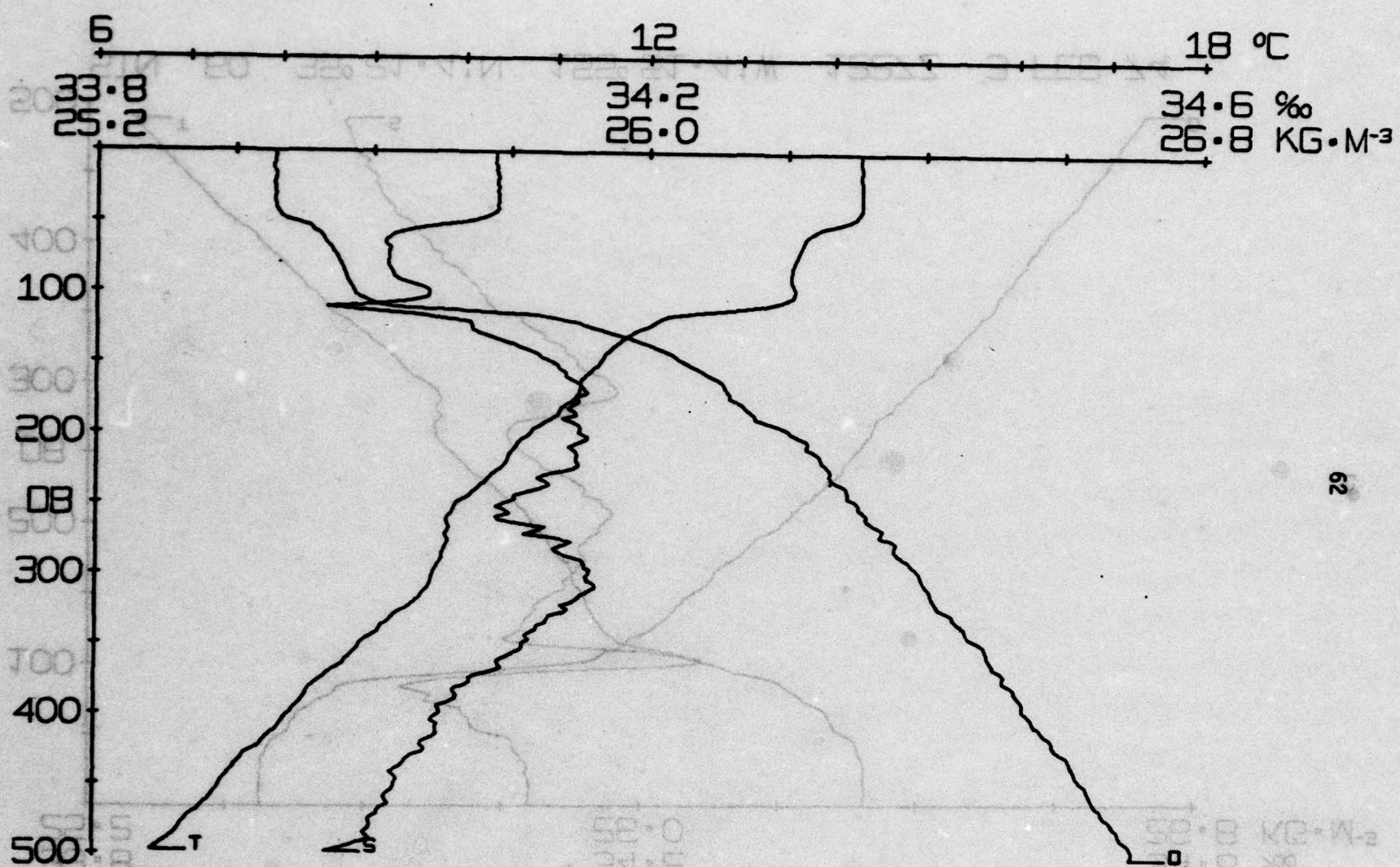
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26·8 KG·M⁻³
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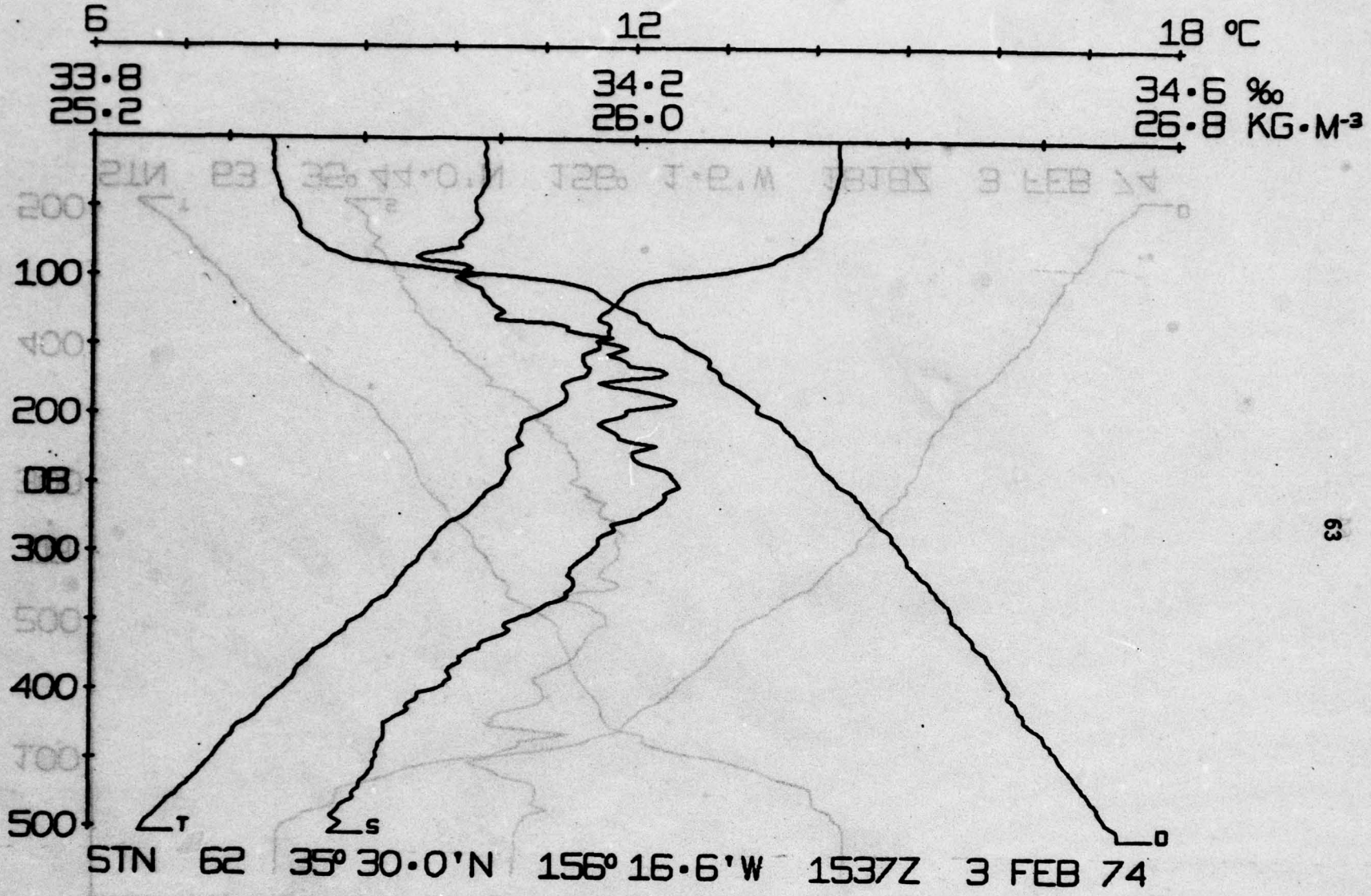
62
STN 61 35° 25·7'N 156° 2·2'W 1354Z 3 FEB 74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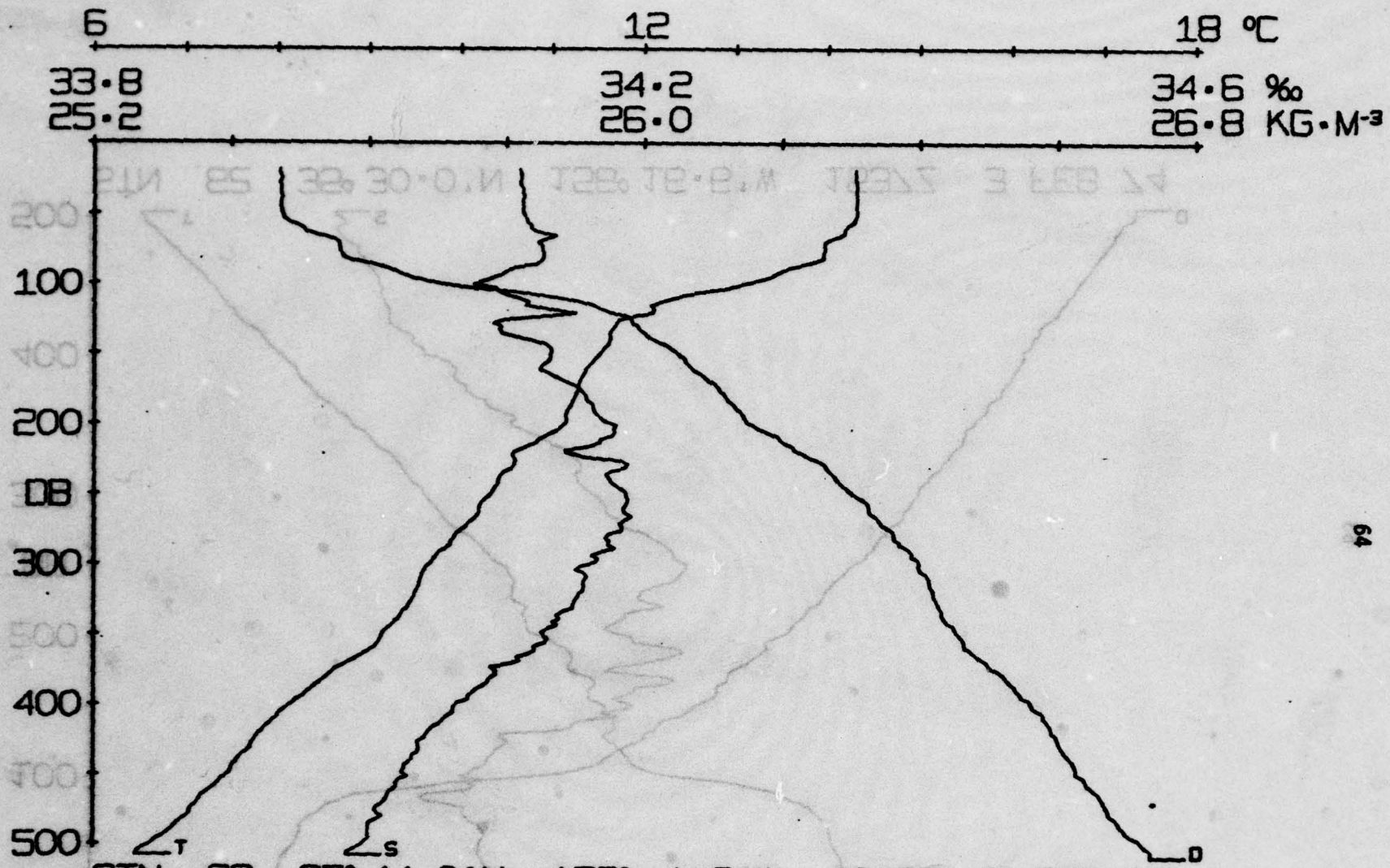
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D
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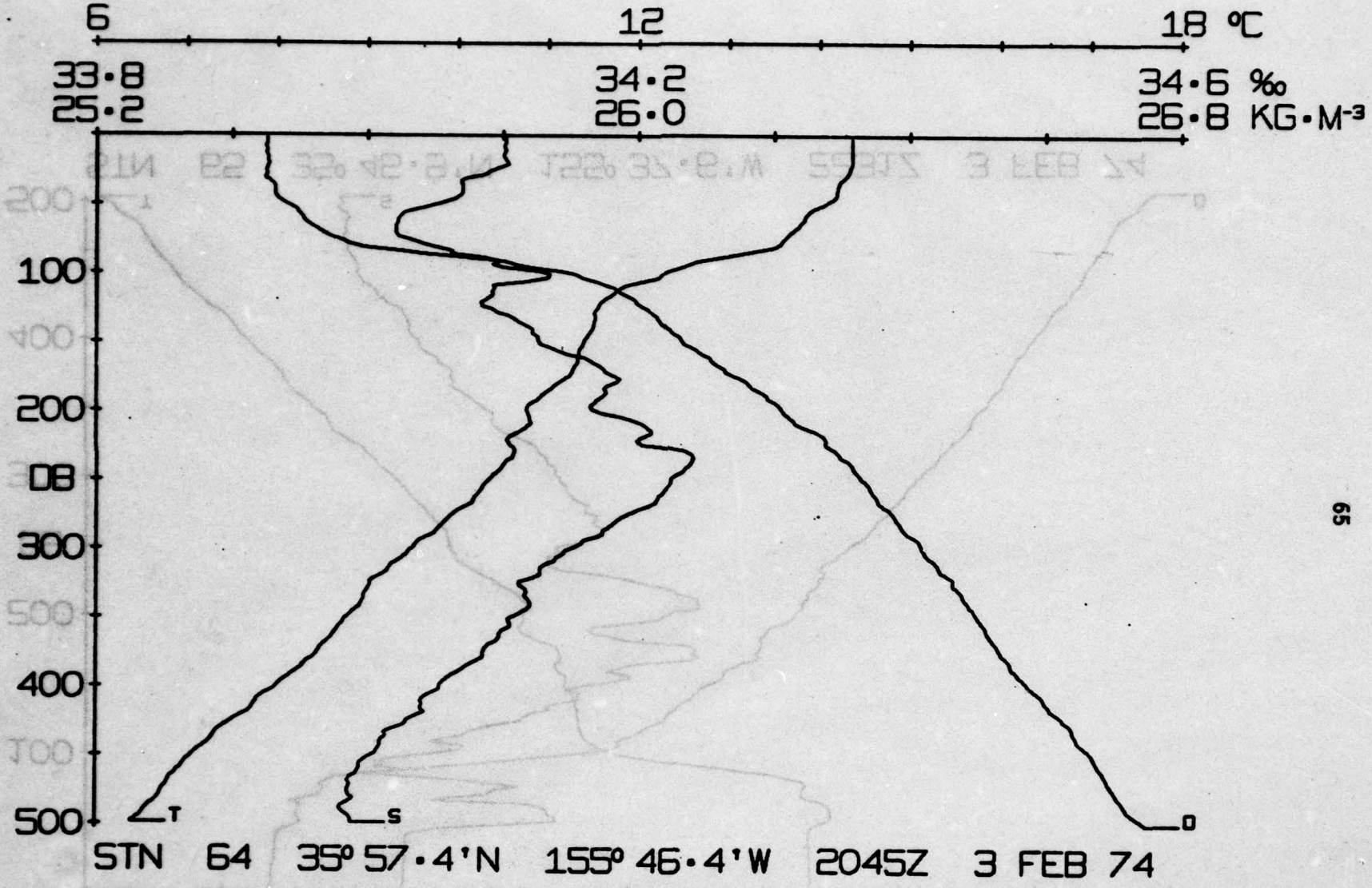
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STN 64 35° 57·4'N 155° 46·4'W 2045Z 3 FEB 74


6
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18 °C
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34·2
34·6 ‰
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26·0
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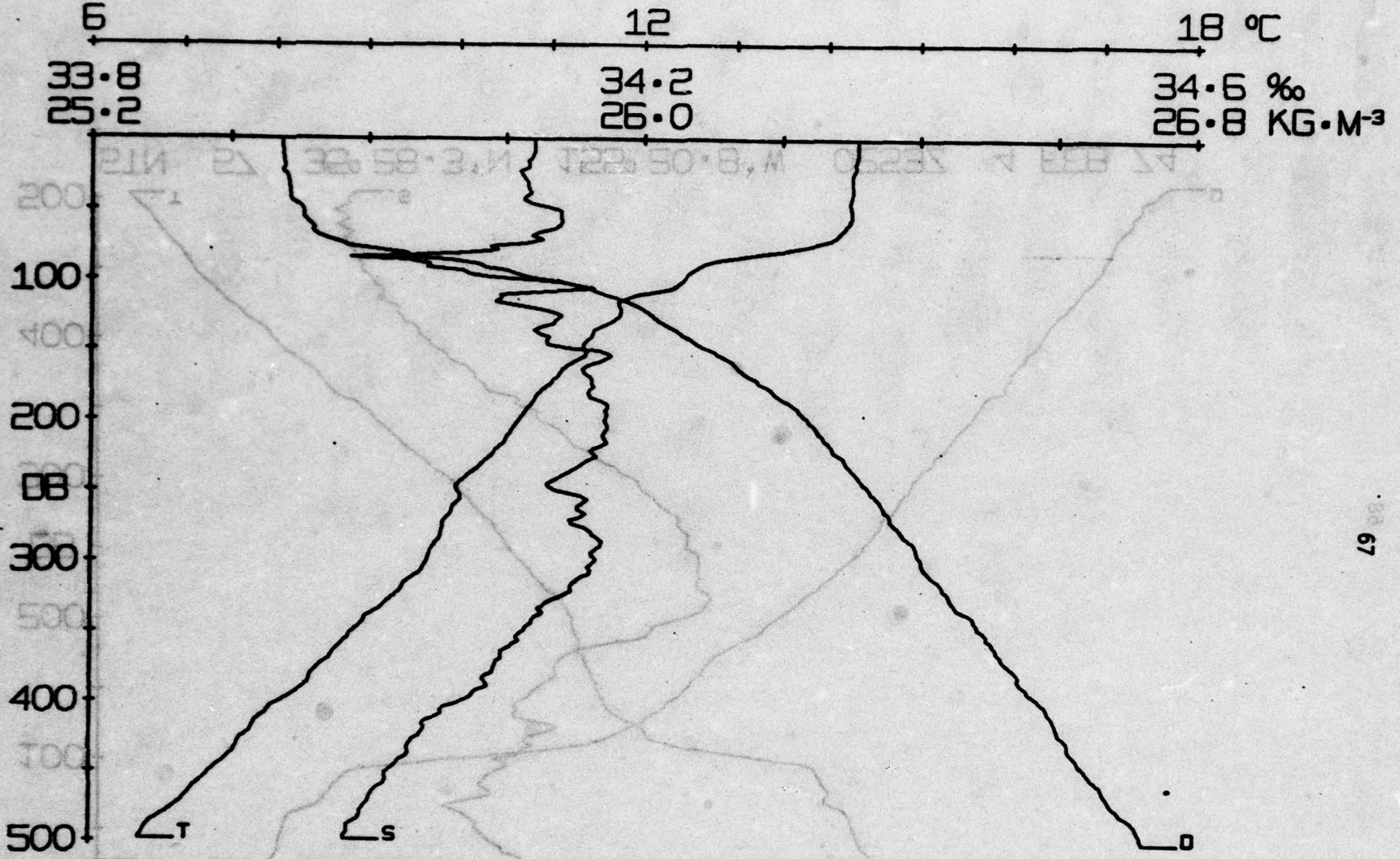
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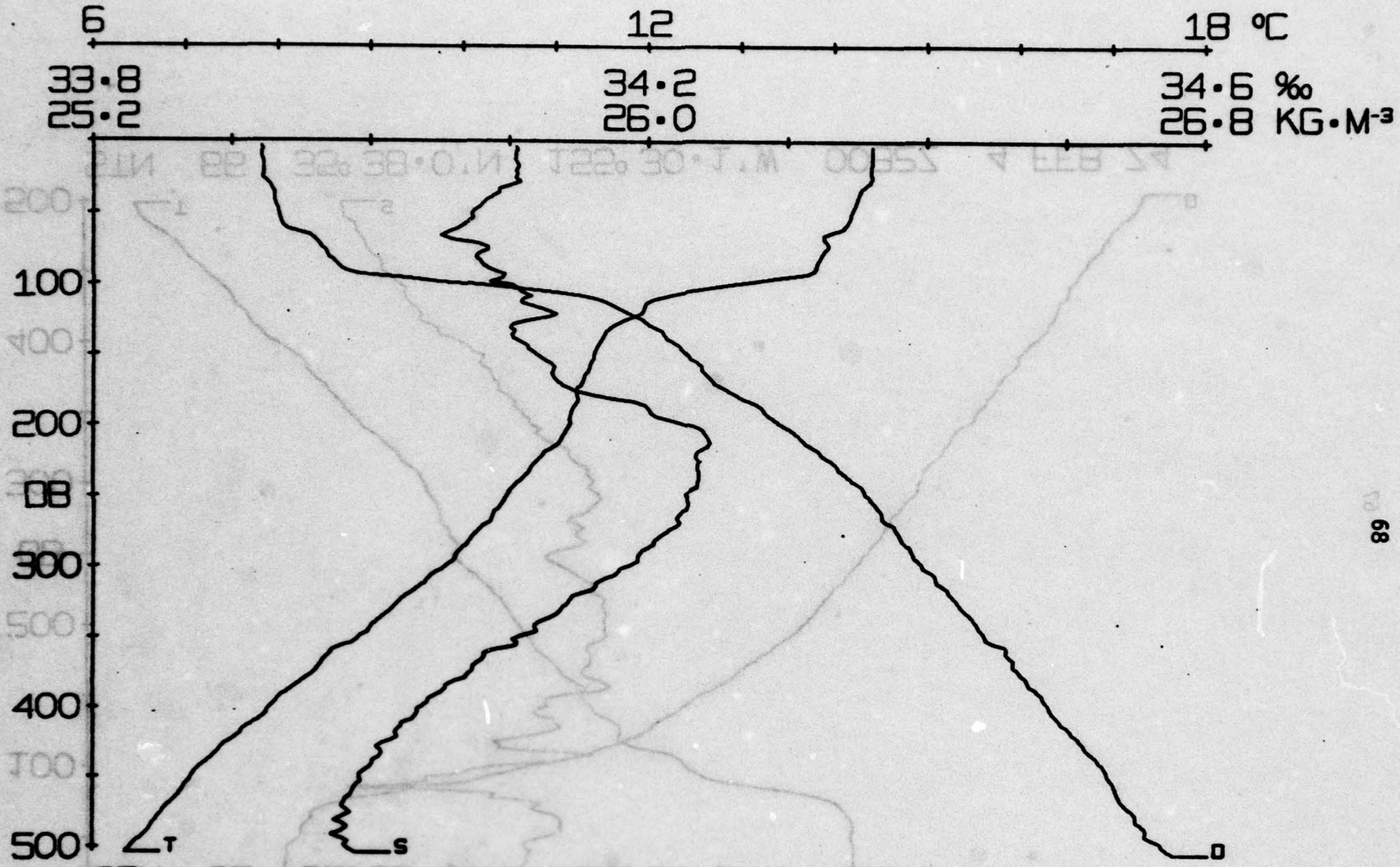
STN 66 35° 38·0'N 155° 30·1'W 0032Z 4 FEB 74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25·2
26·0
26·8 KG·M⁻³
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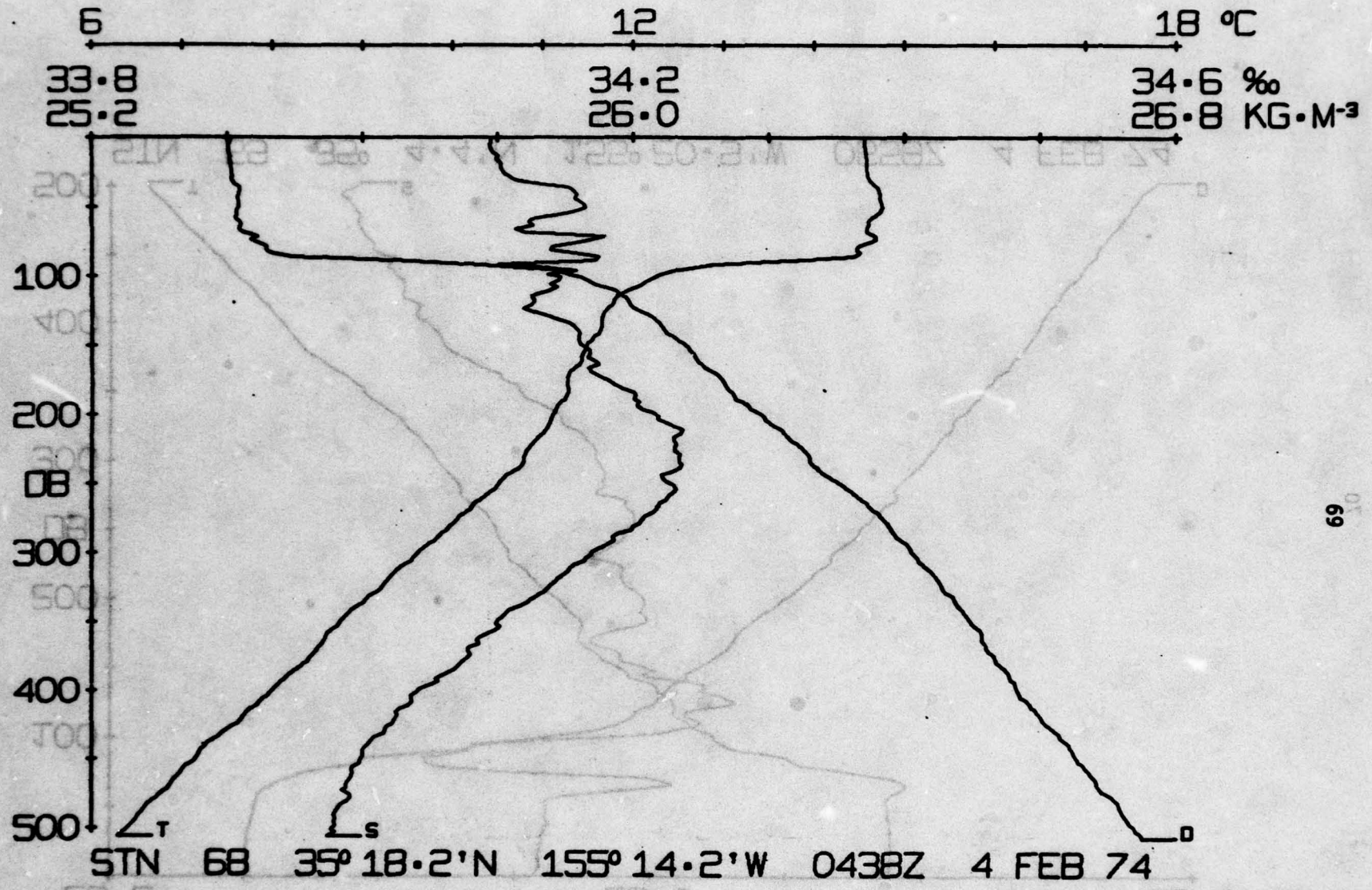
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26·0
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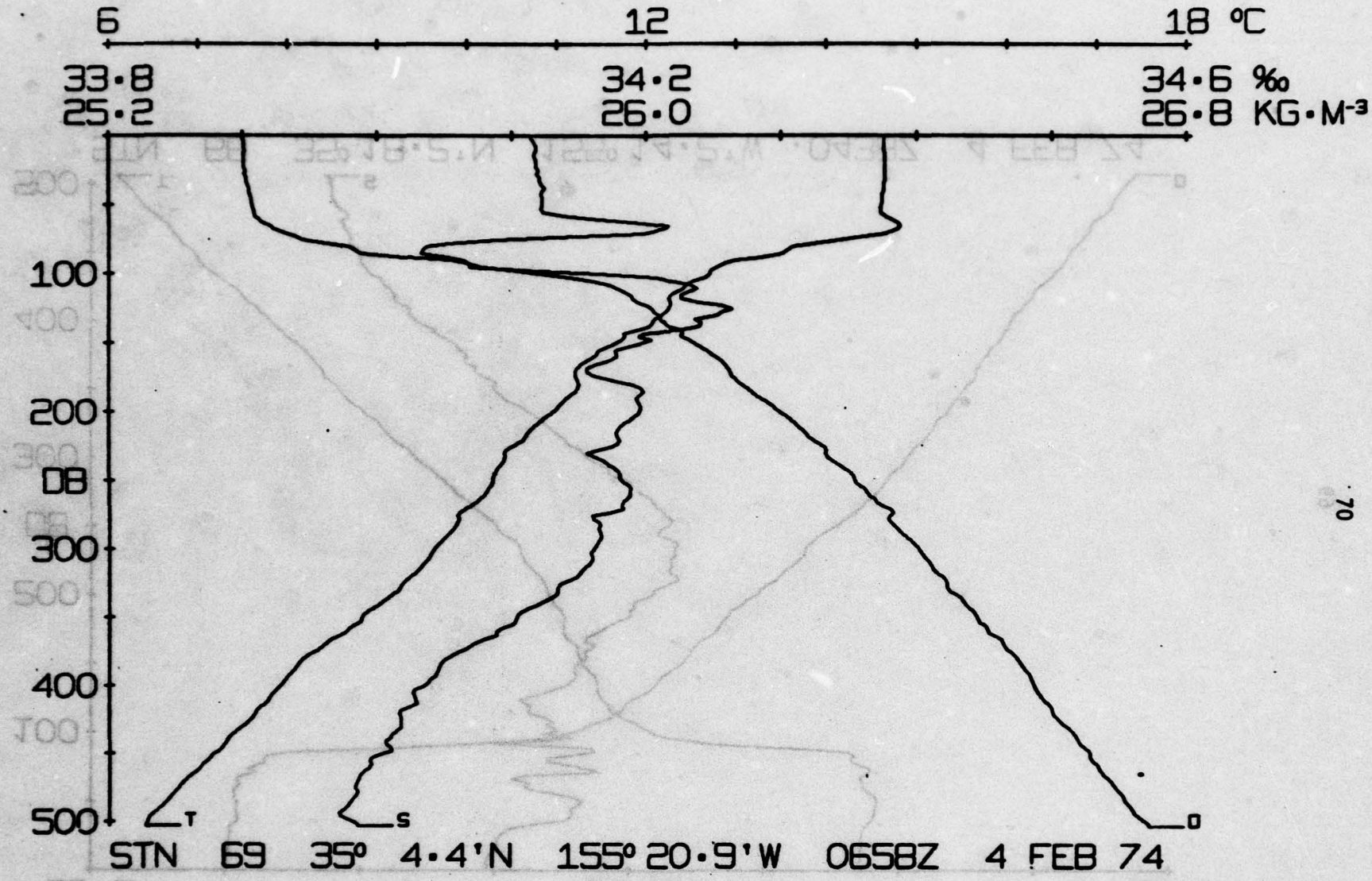
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26·8 KG·M⁻³
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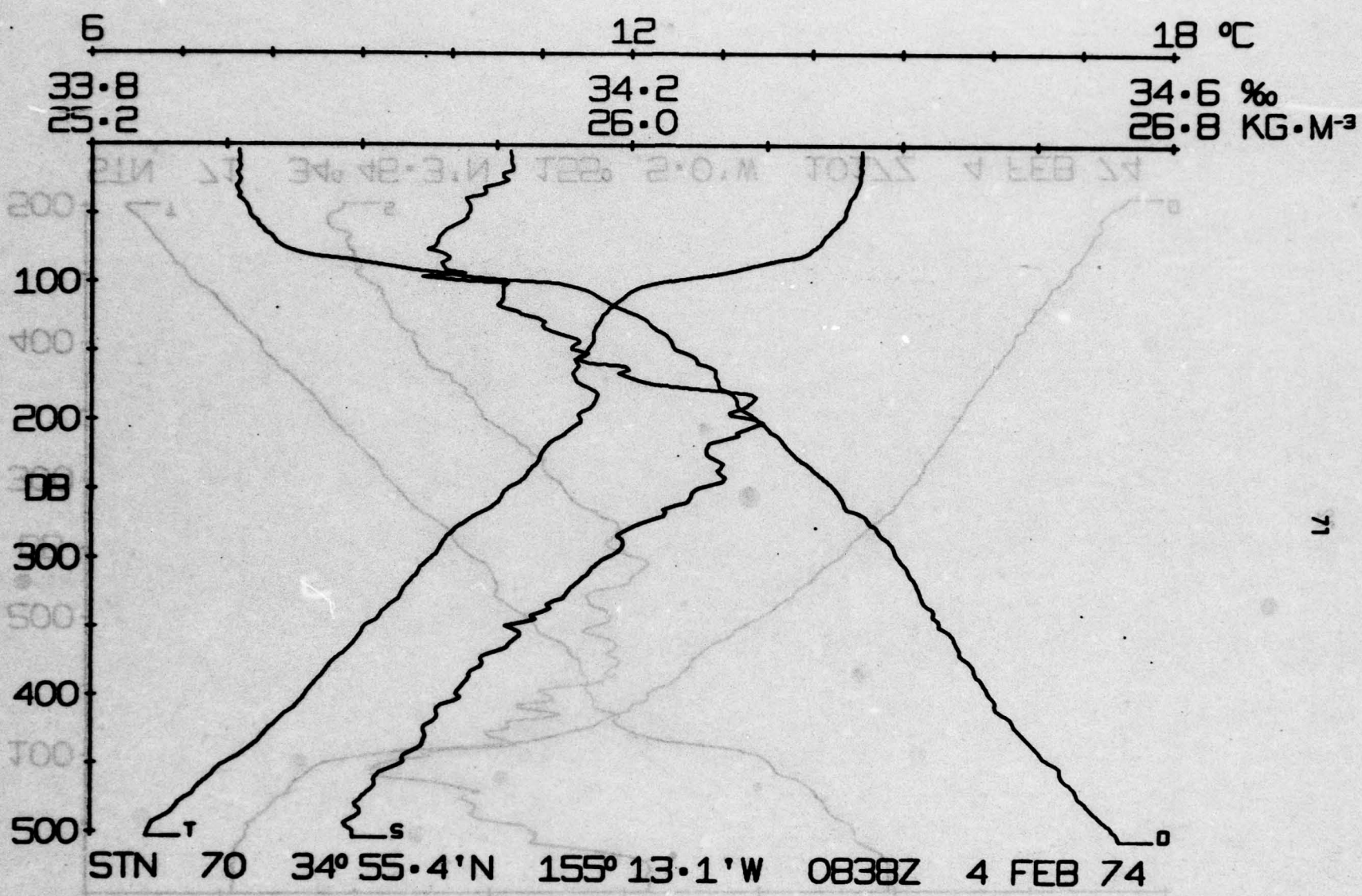
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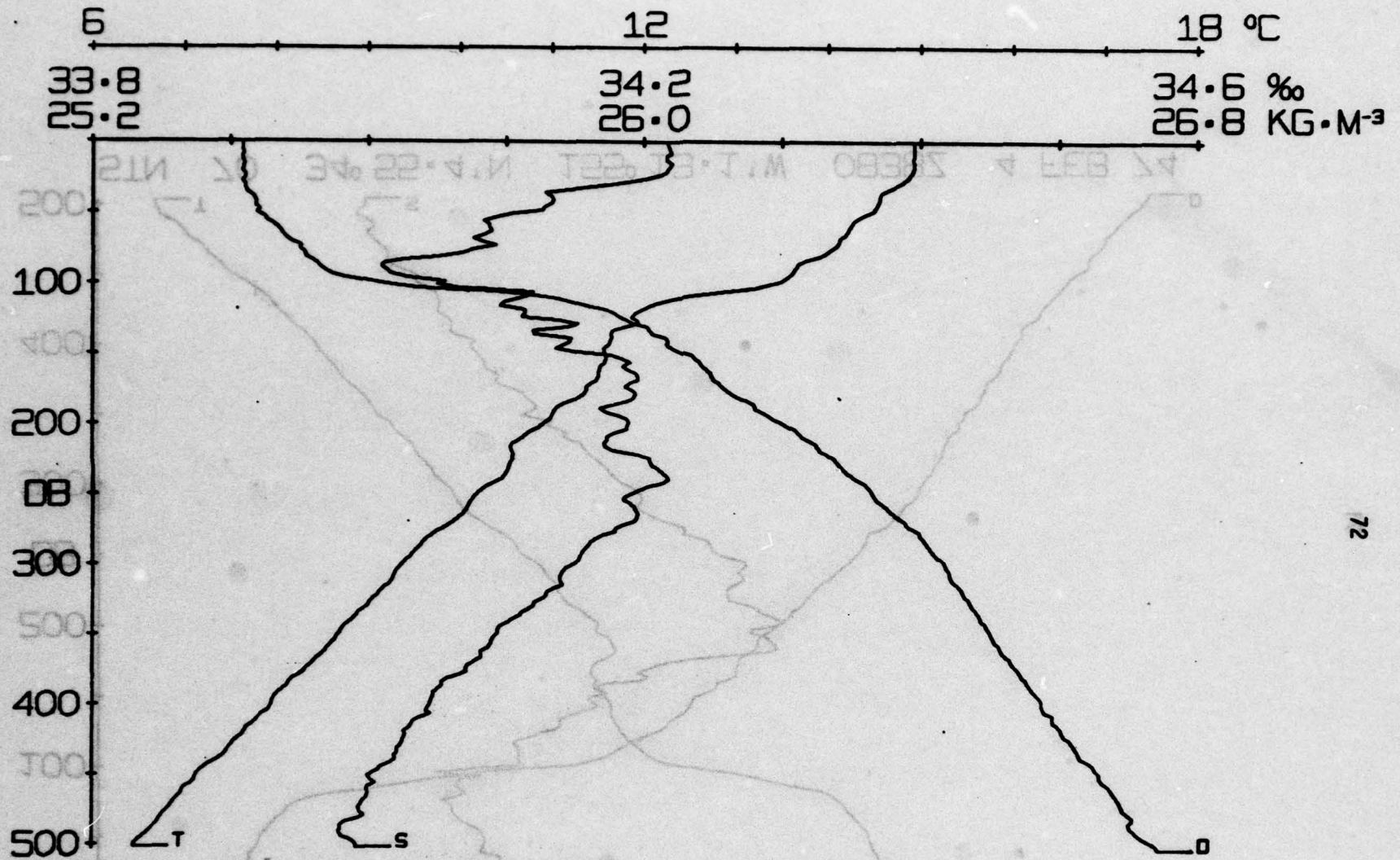
STN 70 34° 55·4'N 155° 13·1'W 0838Z 4 FEB 74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26·8 KG·M⁻³
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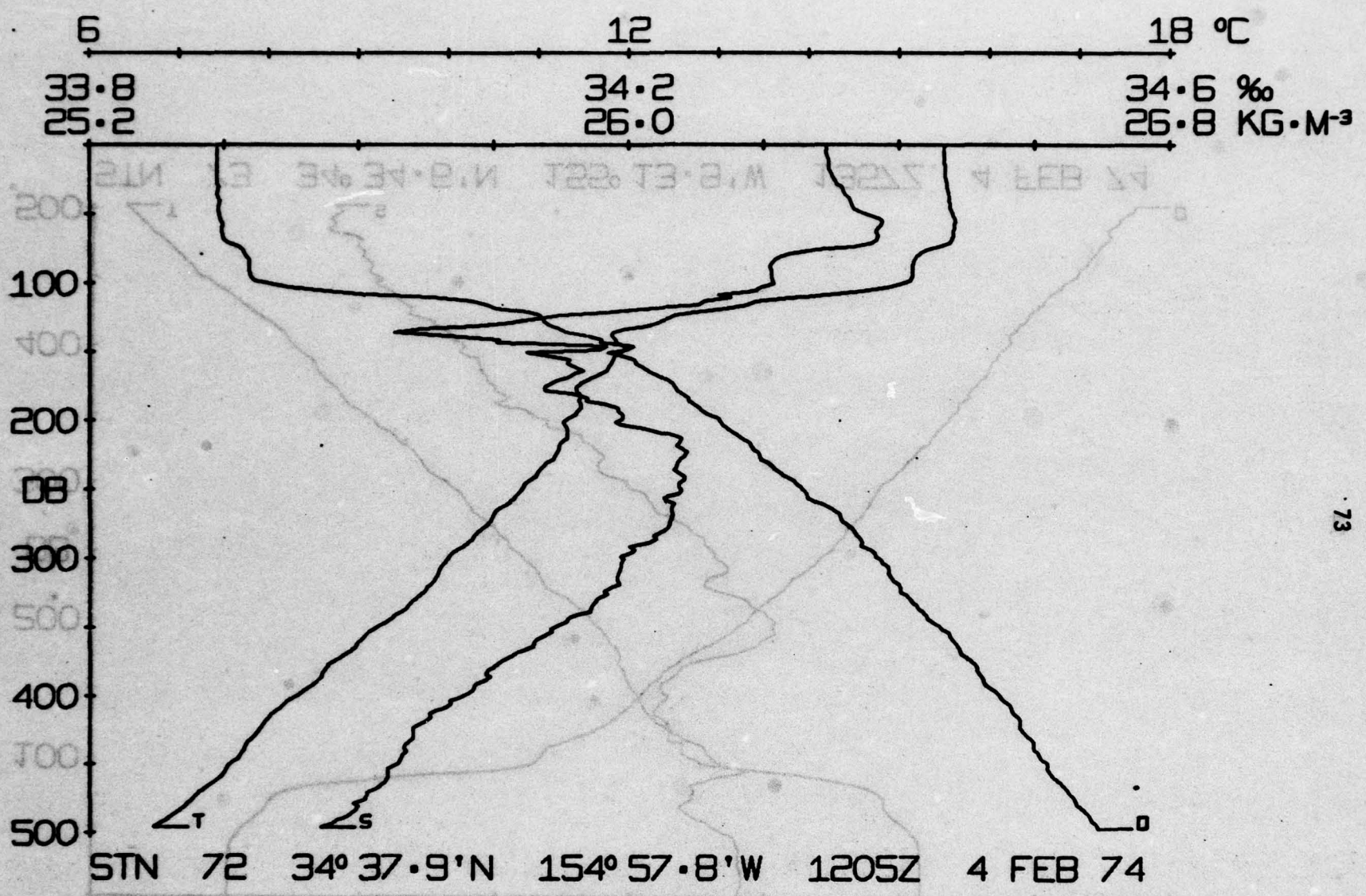
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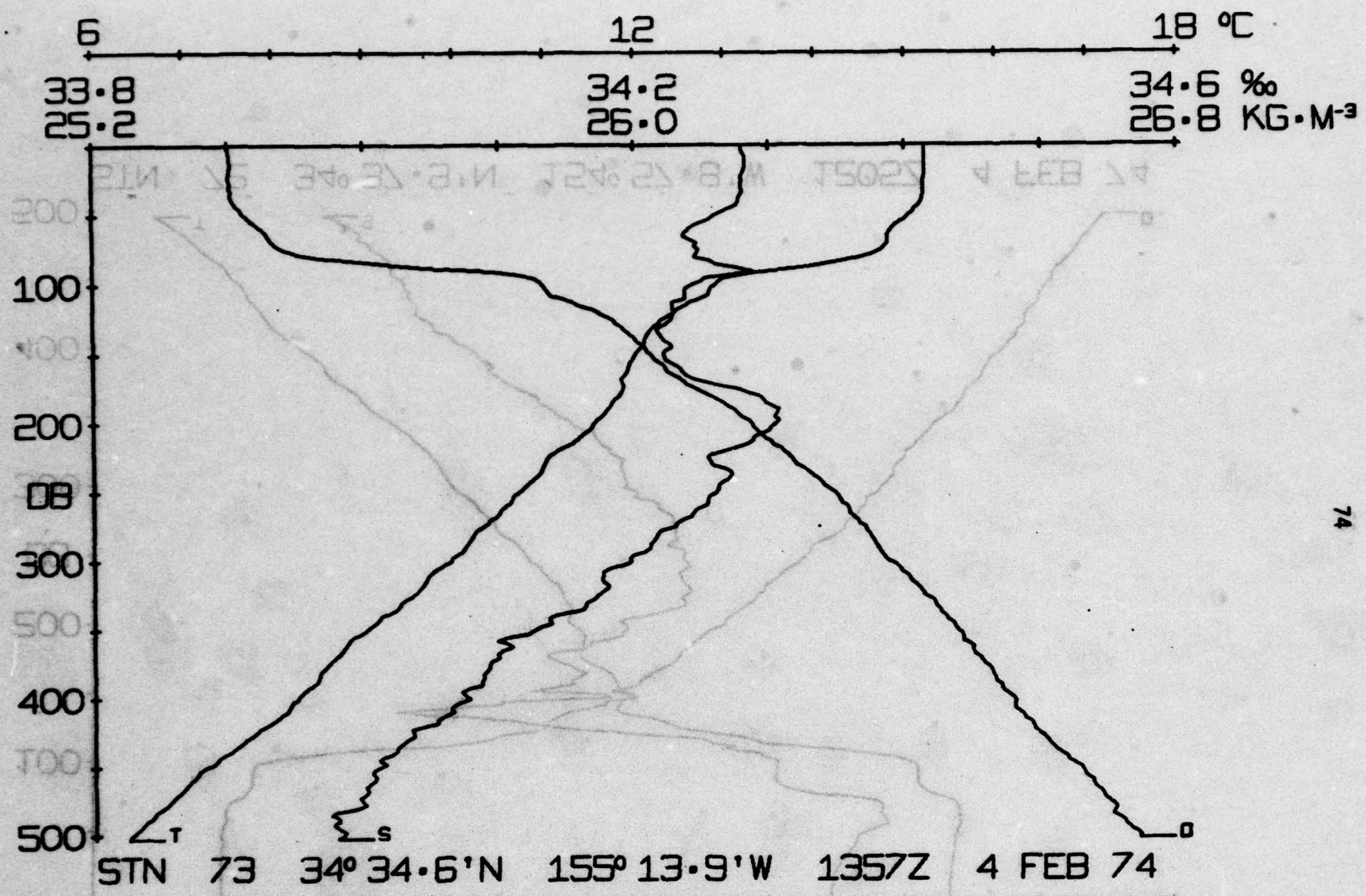
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25·2
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26·8 KG·M-3
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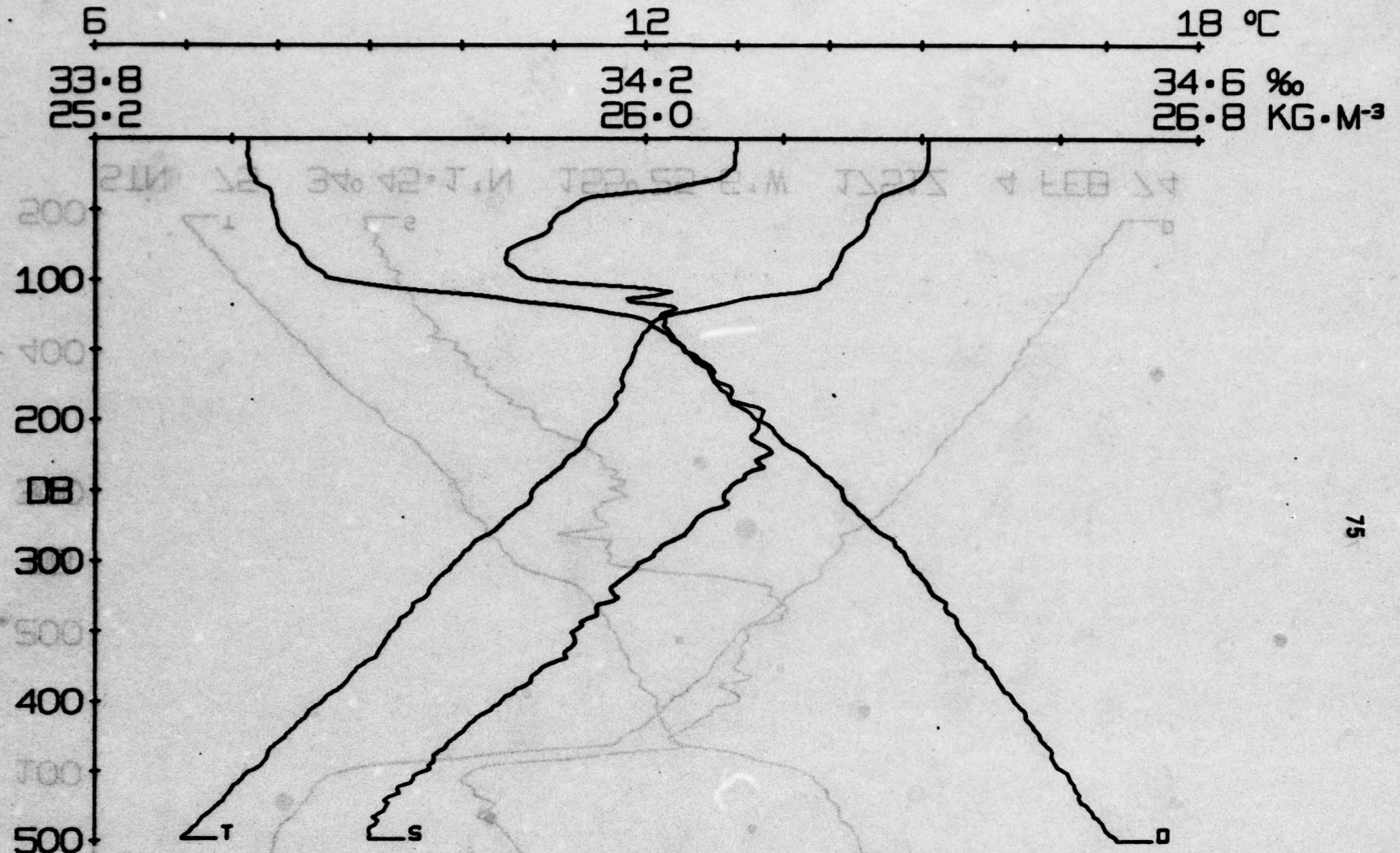
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25·2
26·0
26·8 KG·M⁻³
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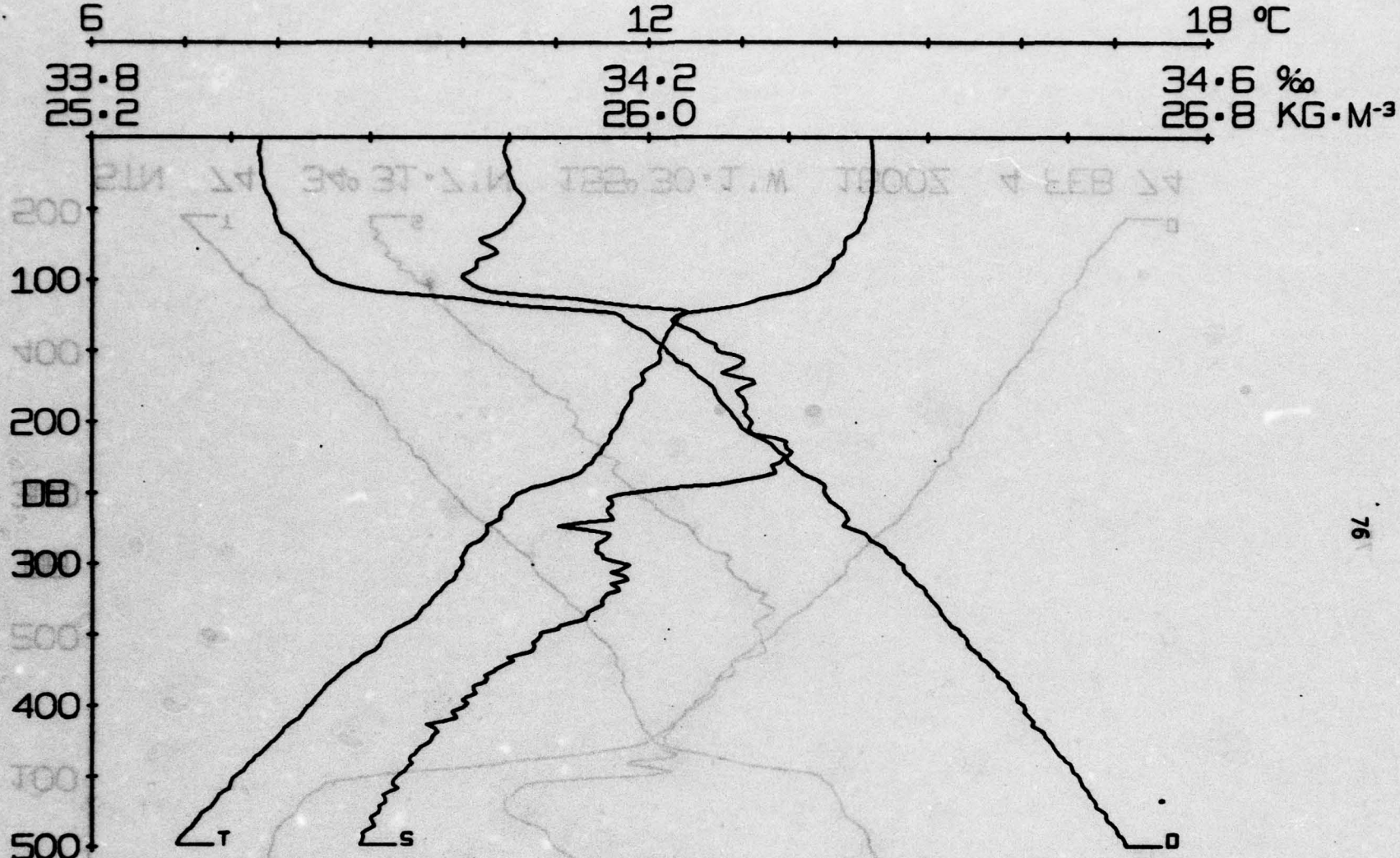
D
STN 74 34° 31·7'N 155° 30·1'W 1600Z 4 FEB 74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T
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D
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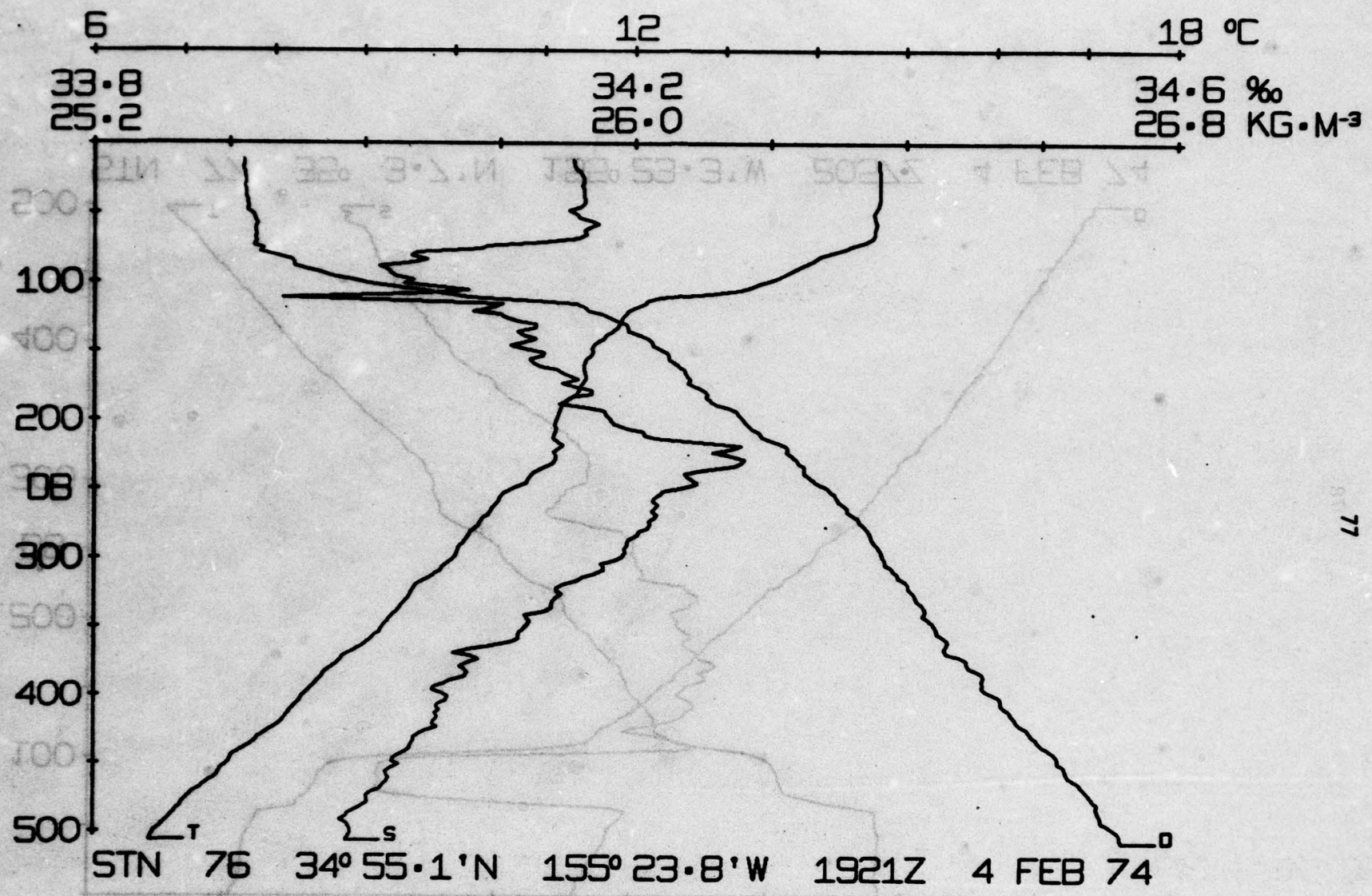
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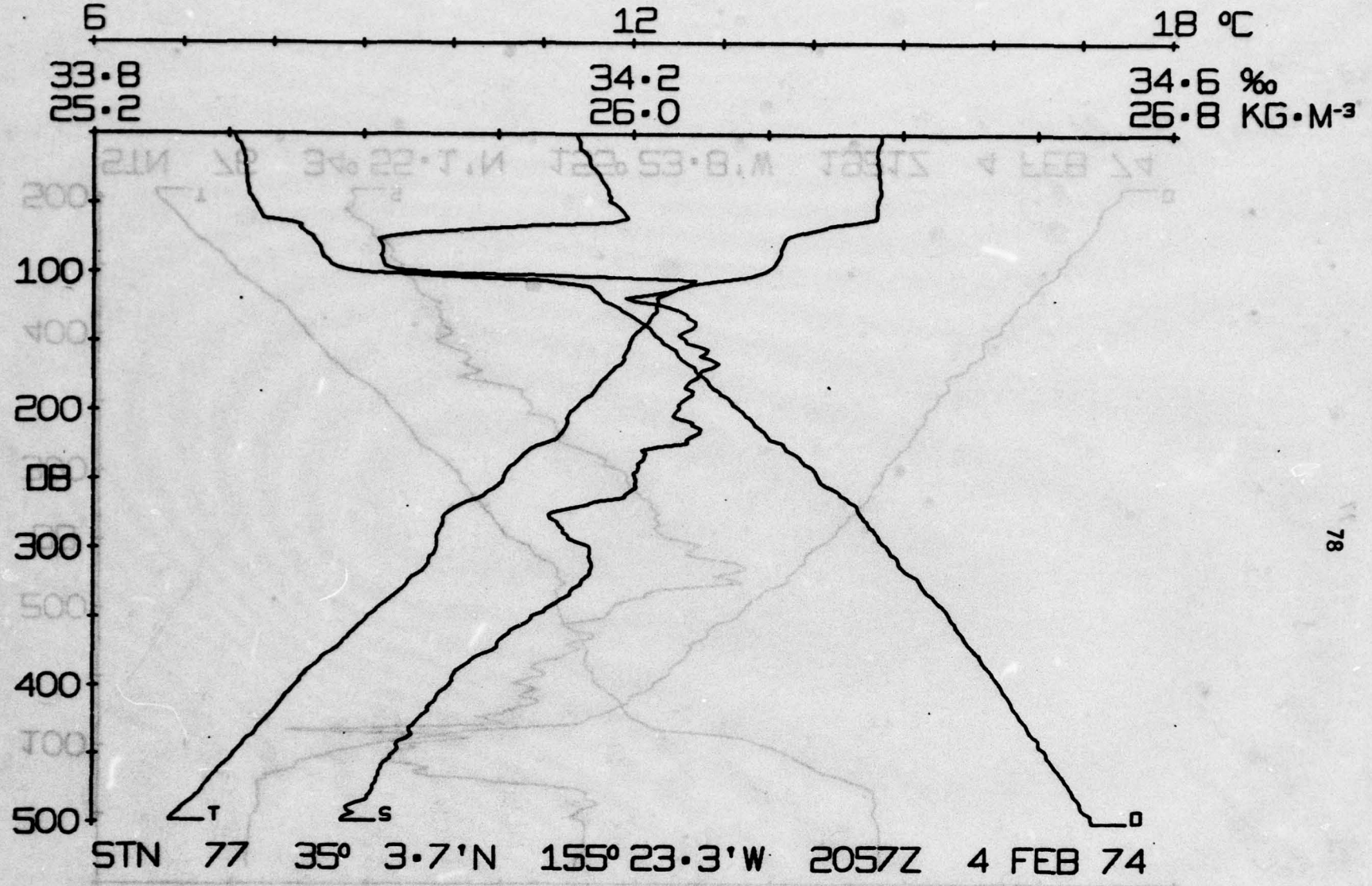
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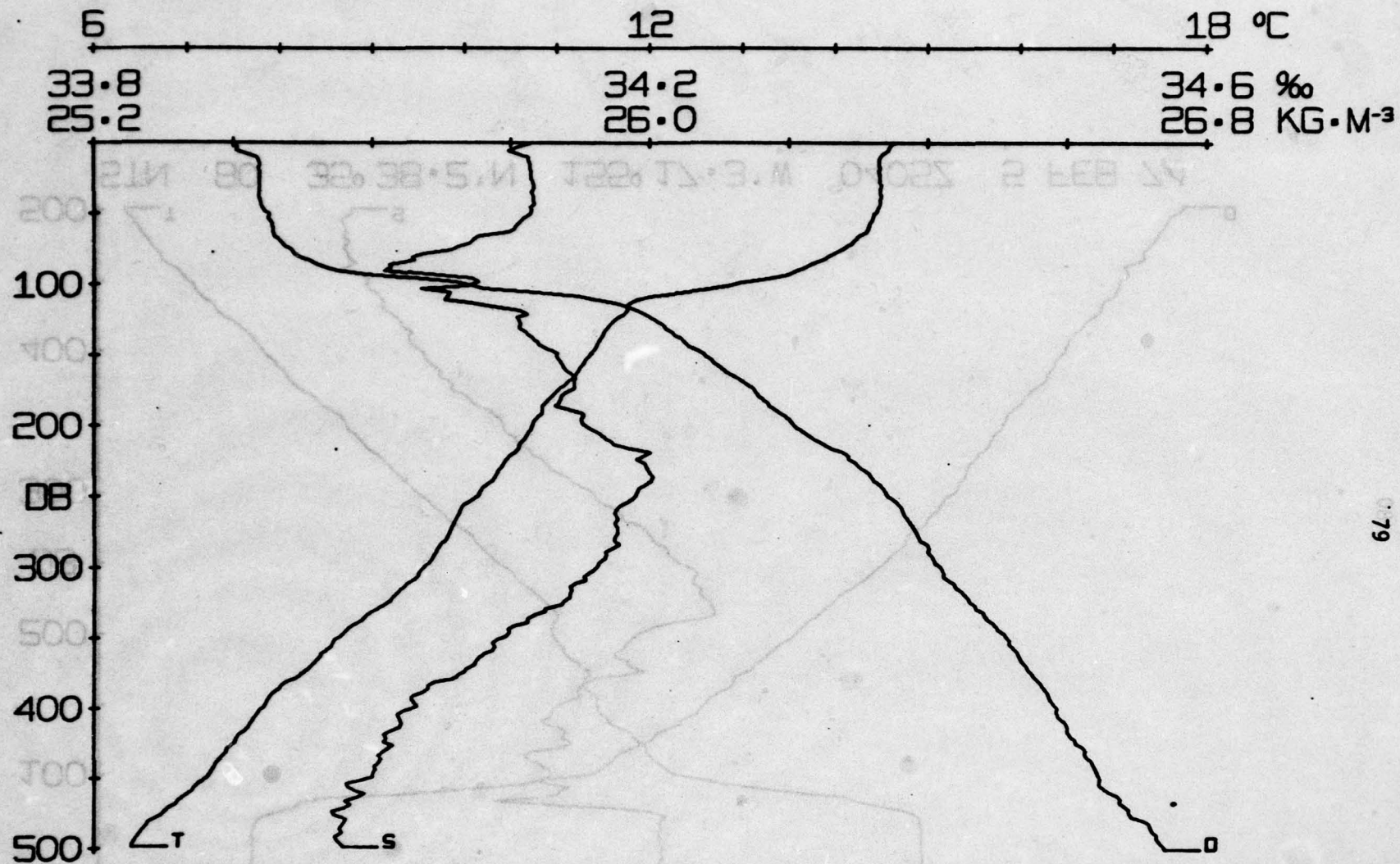
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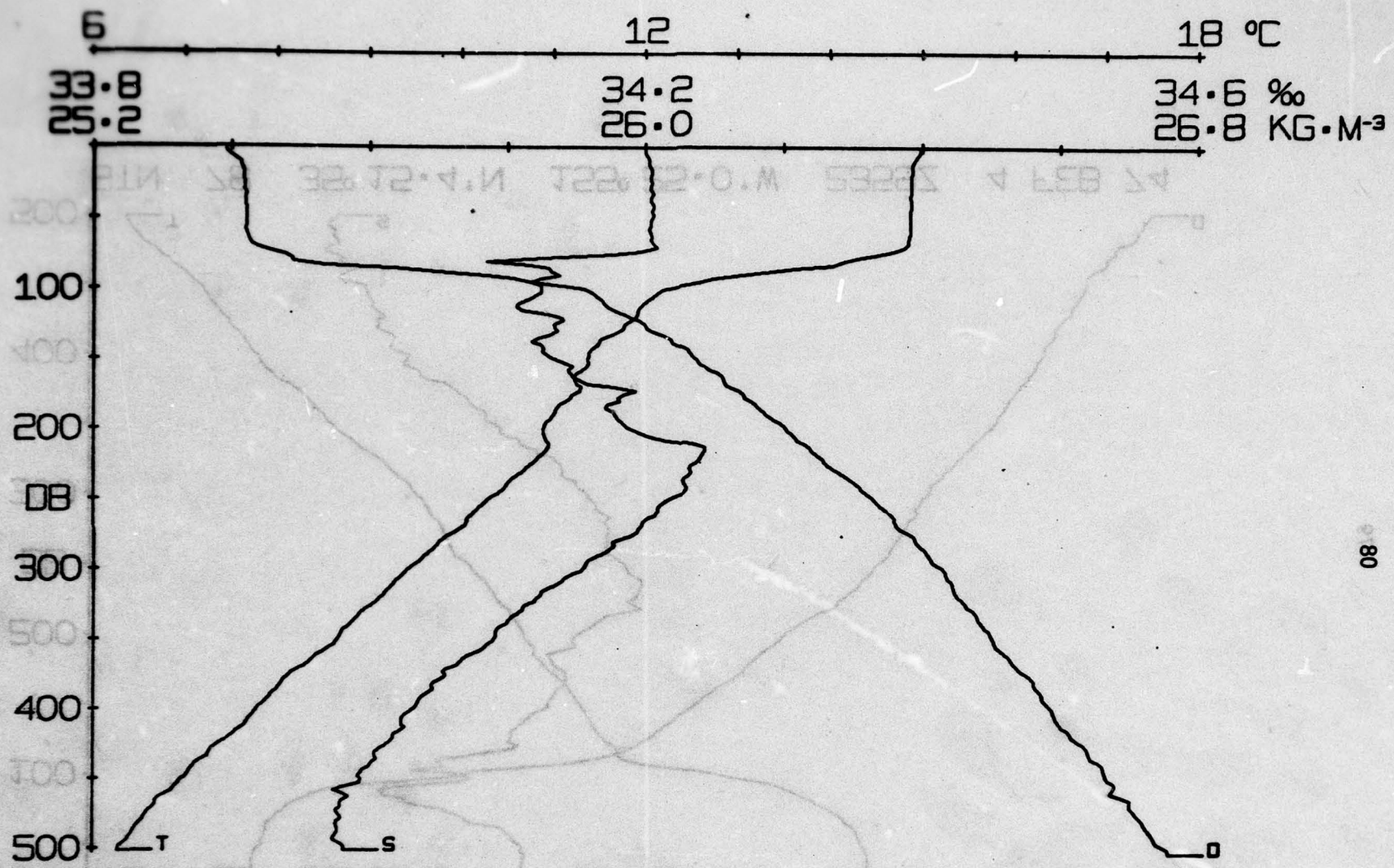
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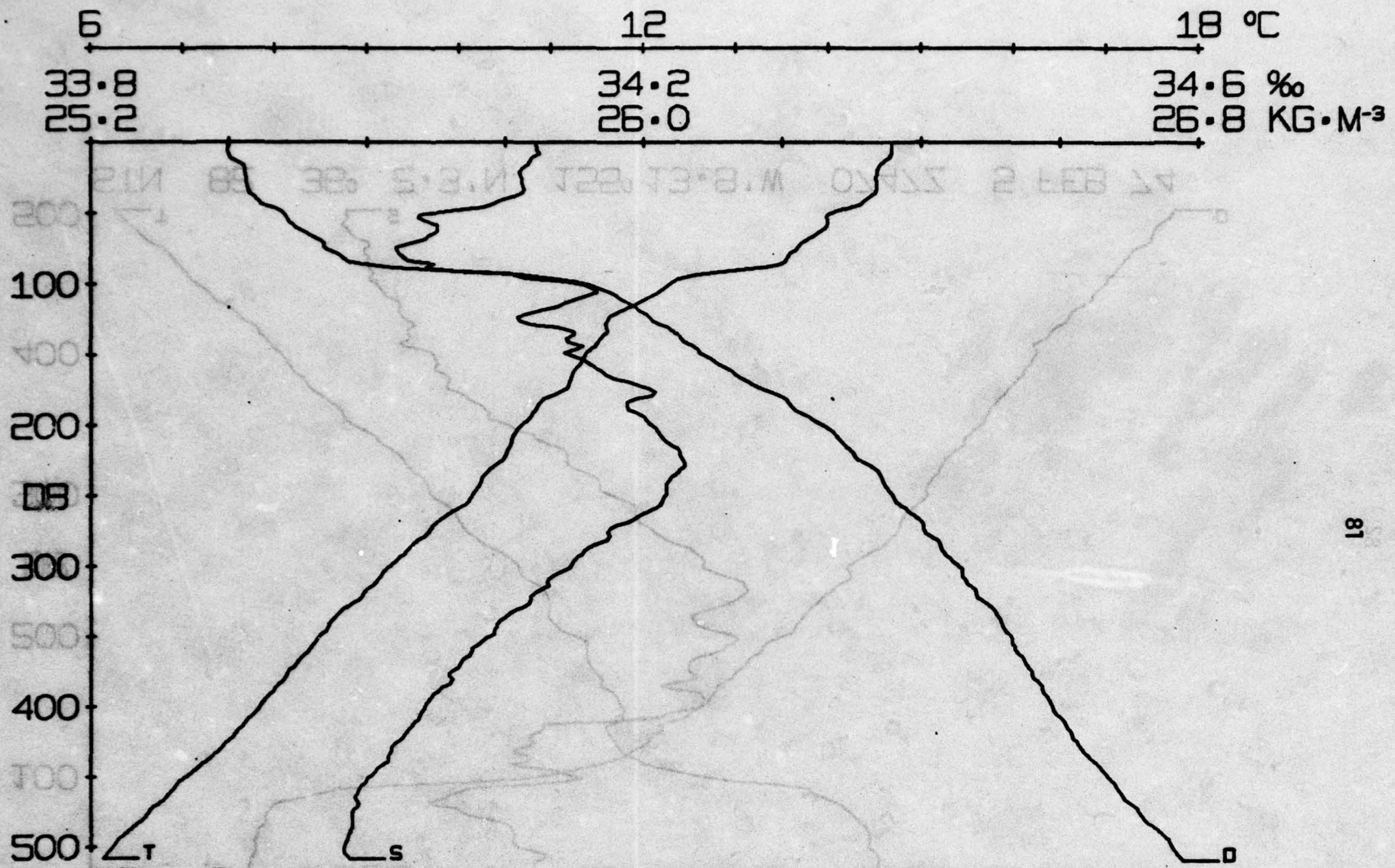
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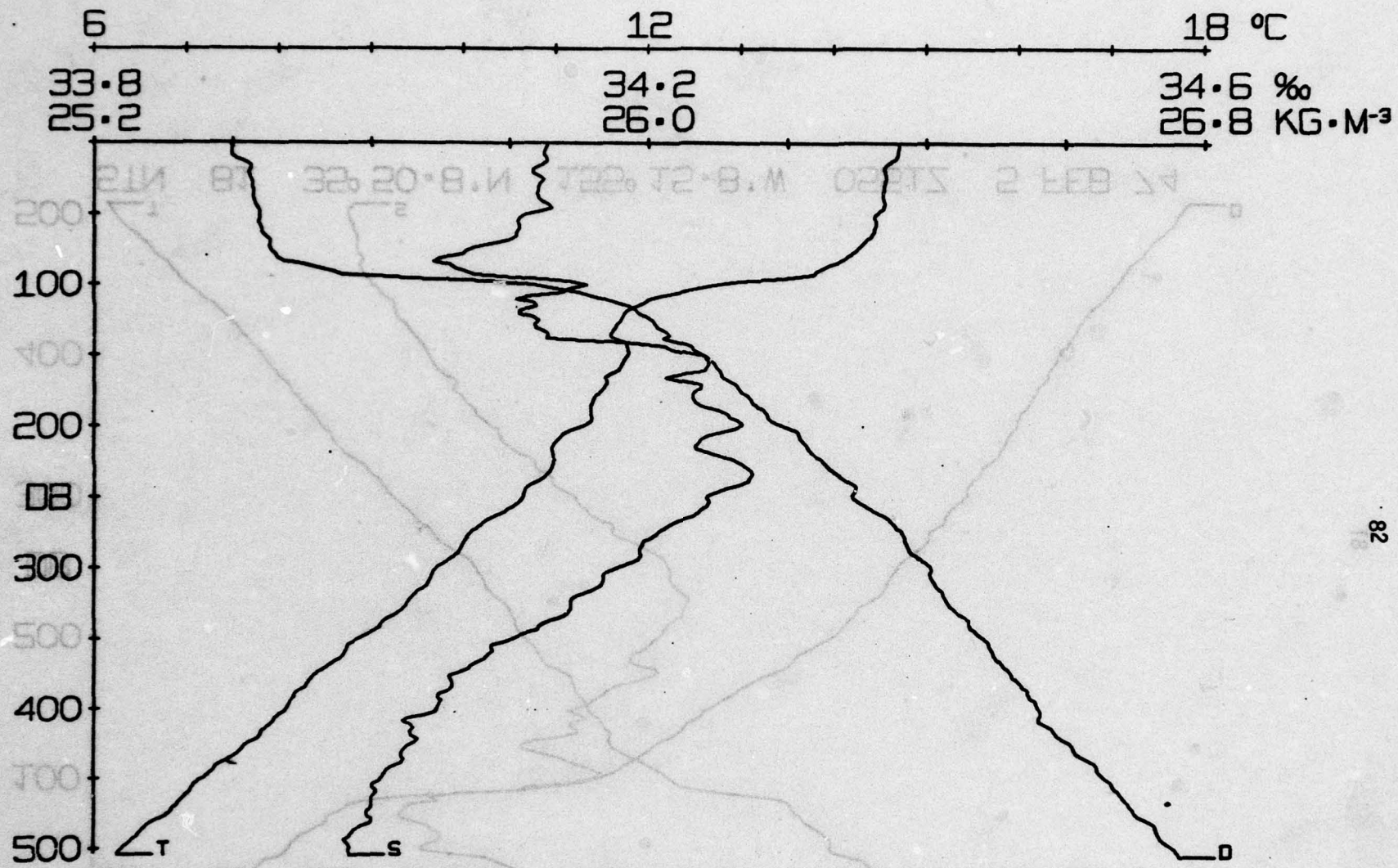
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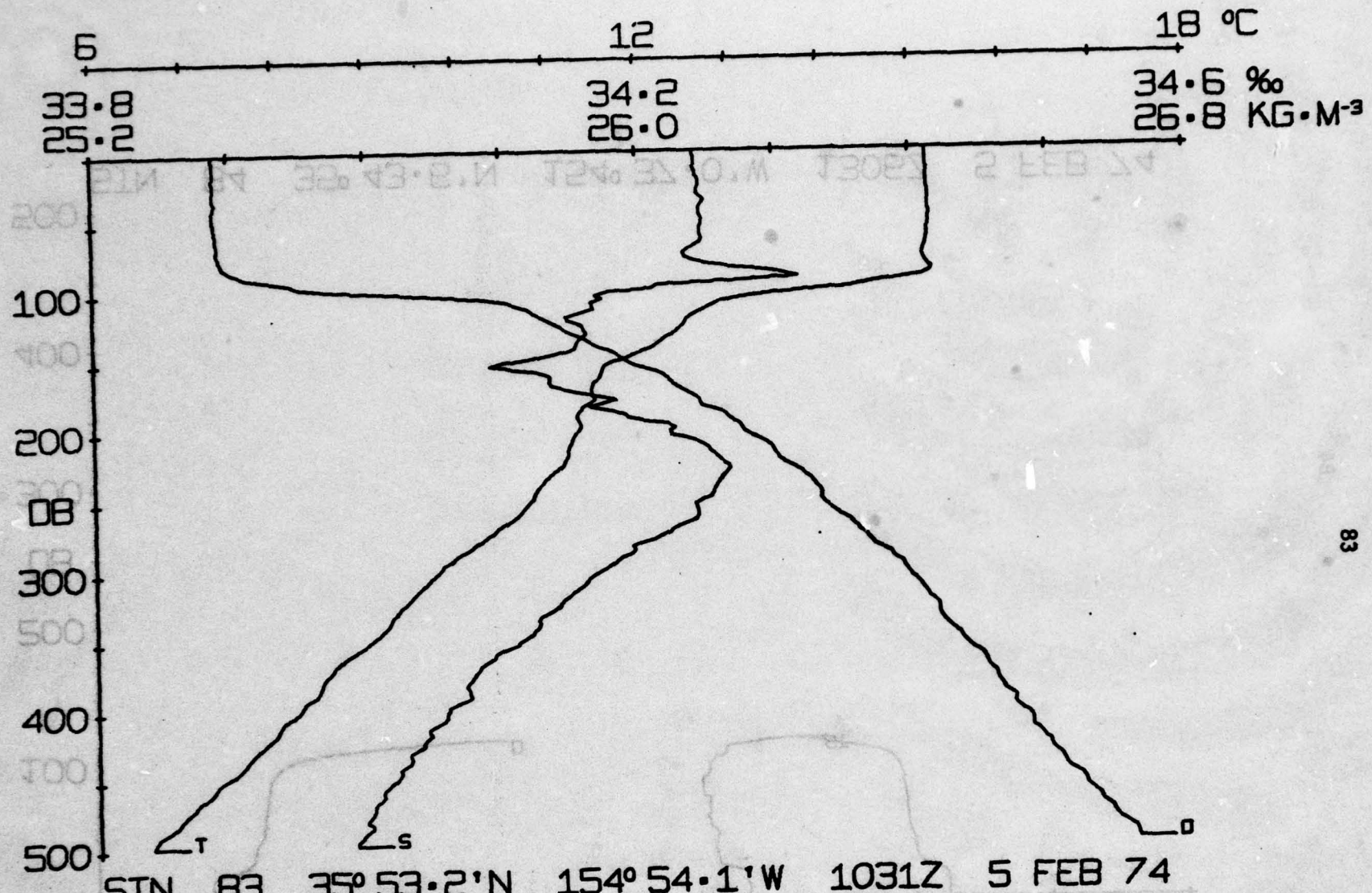
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T
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D
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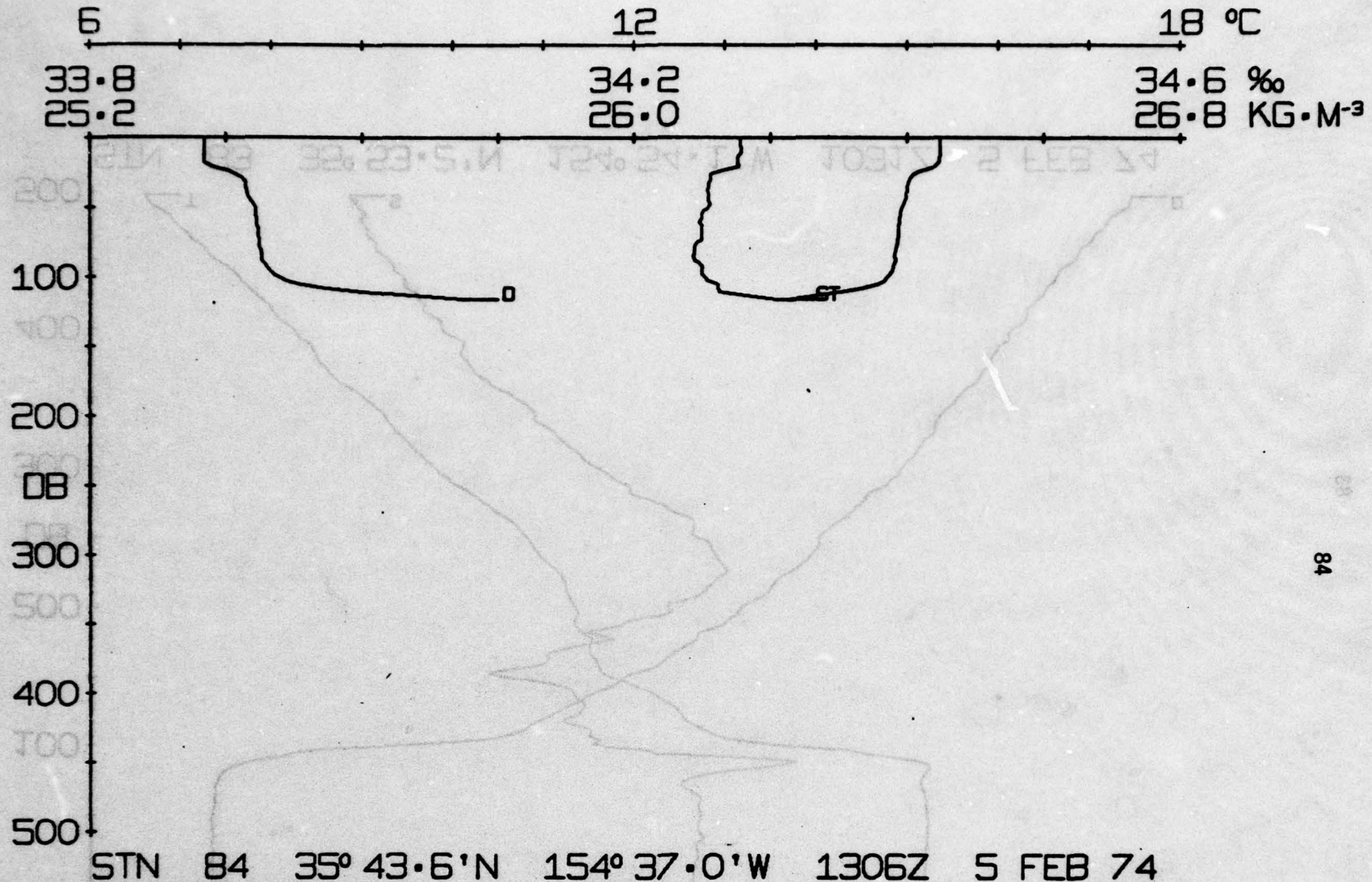
83



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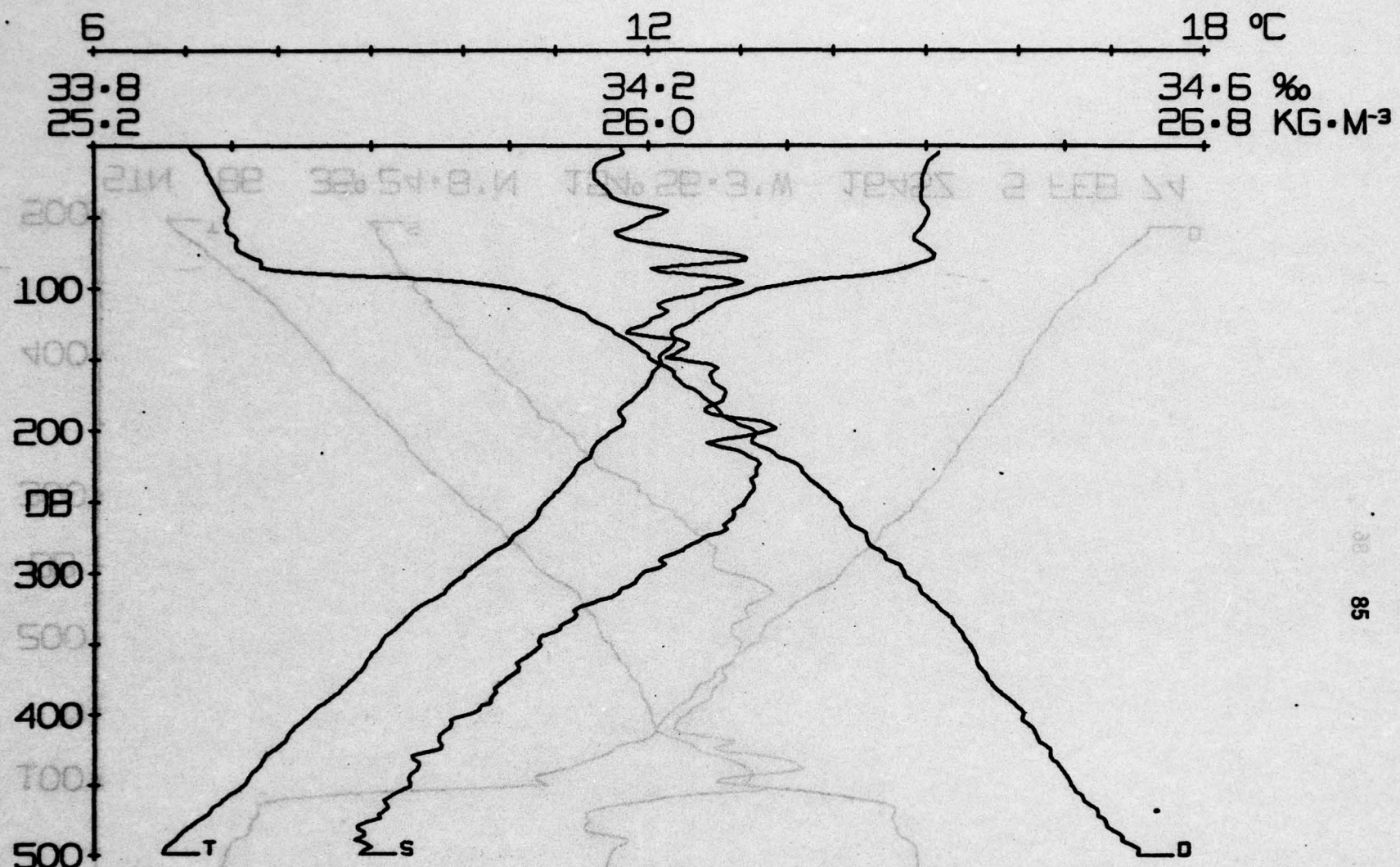
84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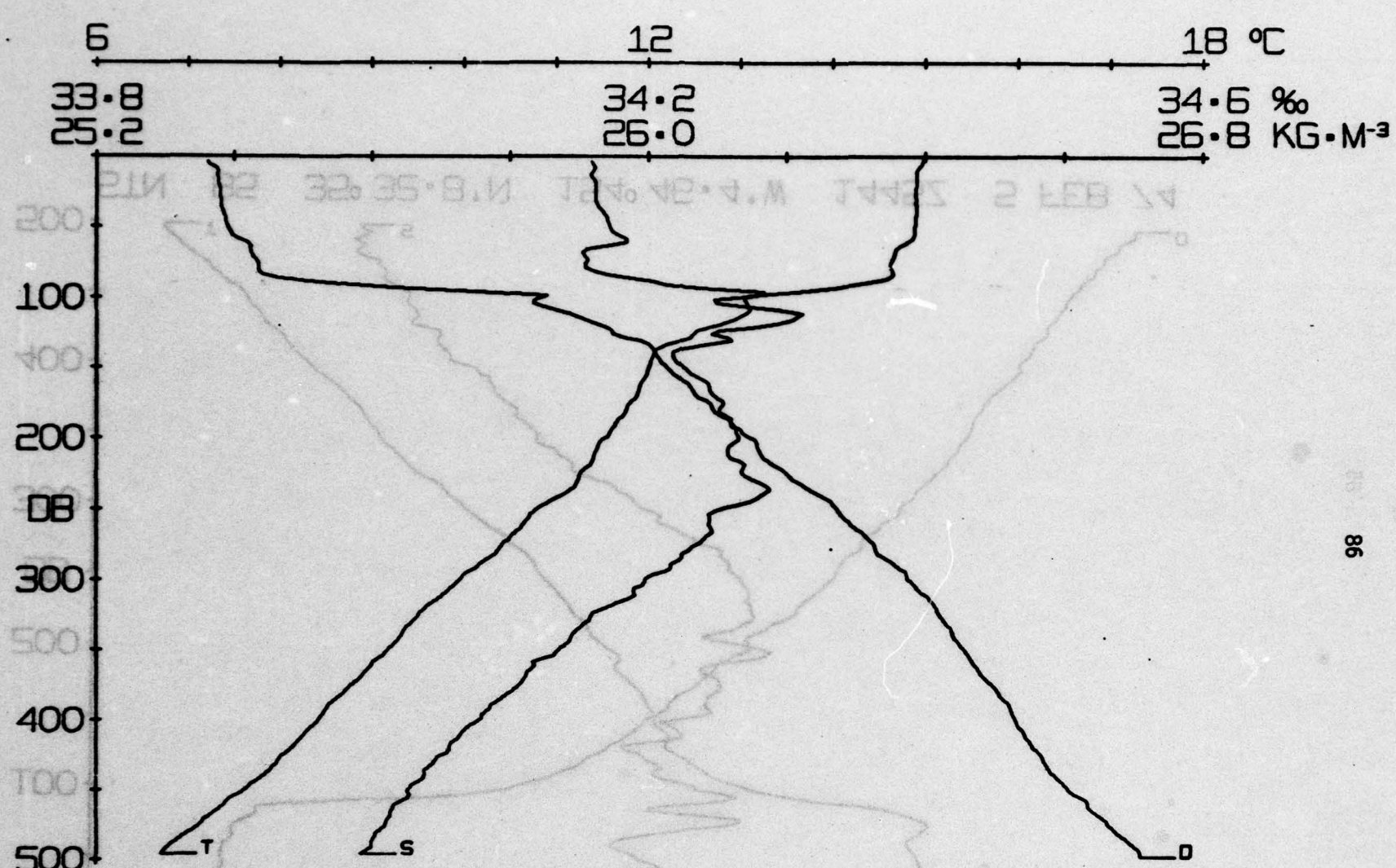
85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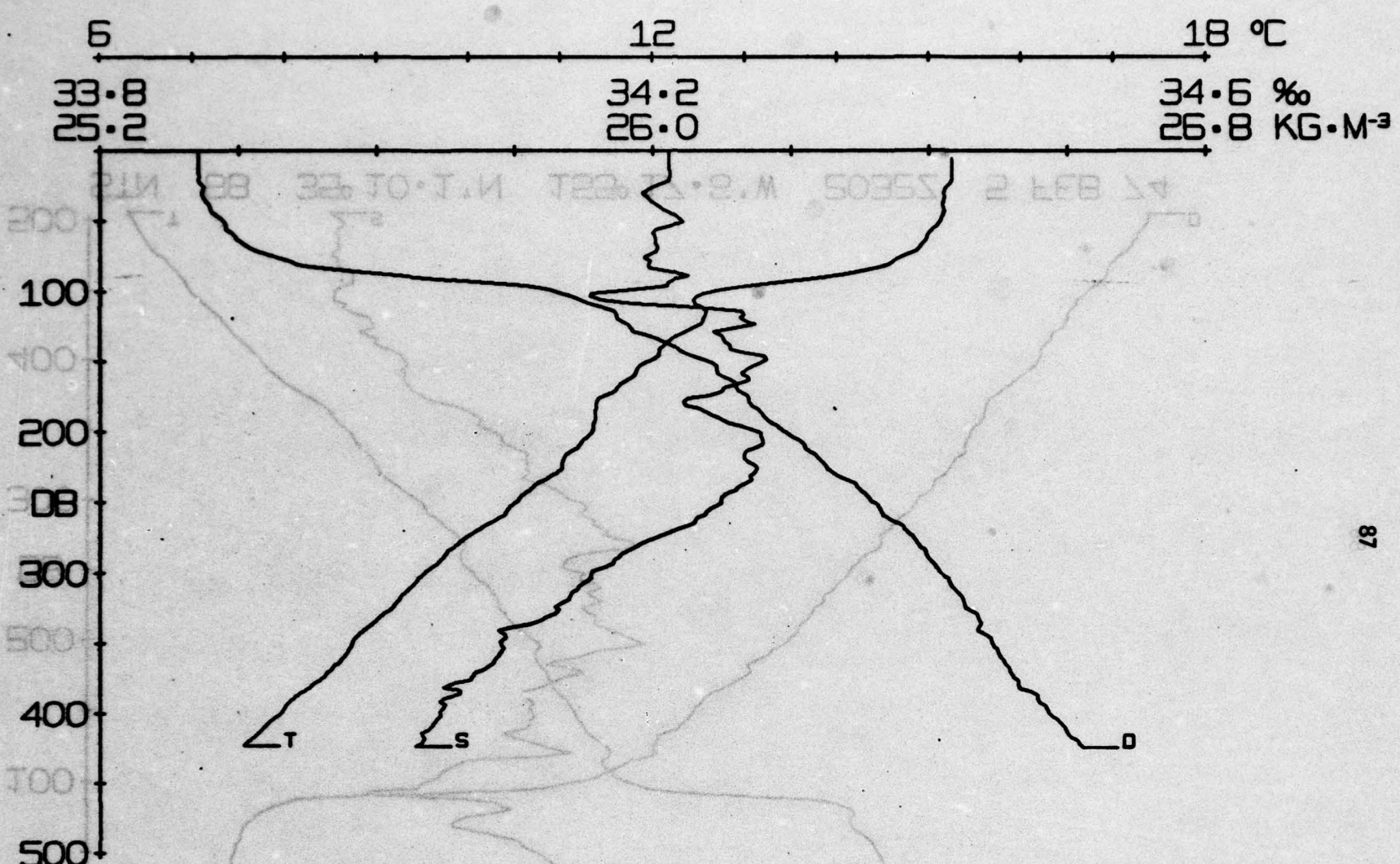
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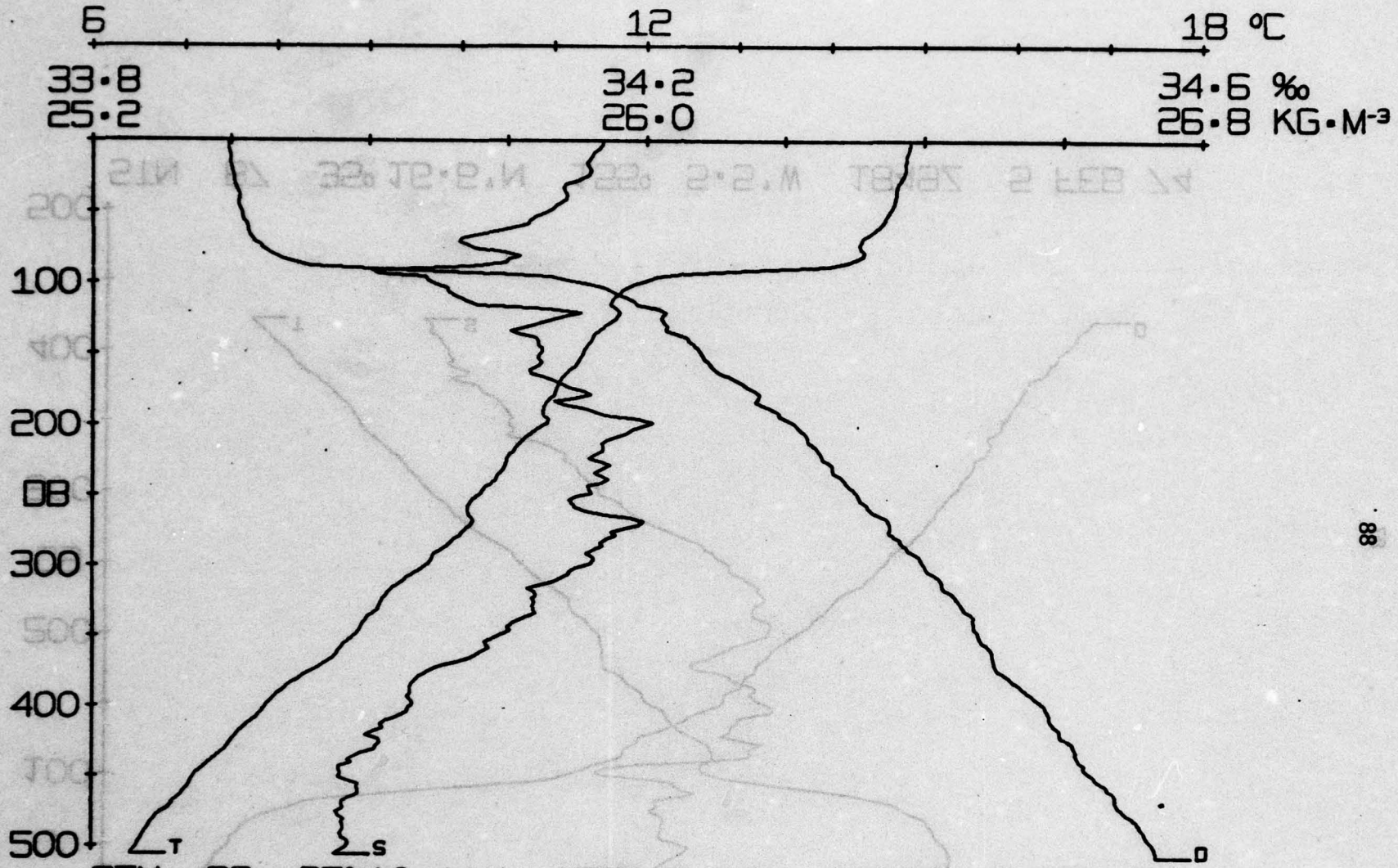
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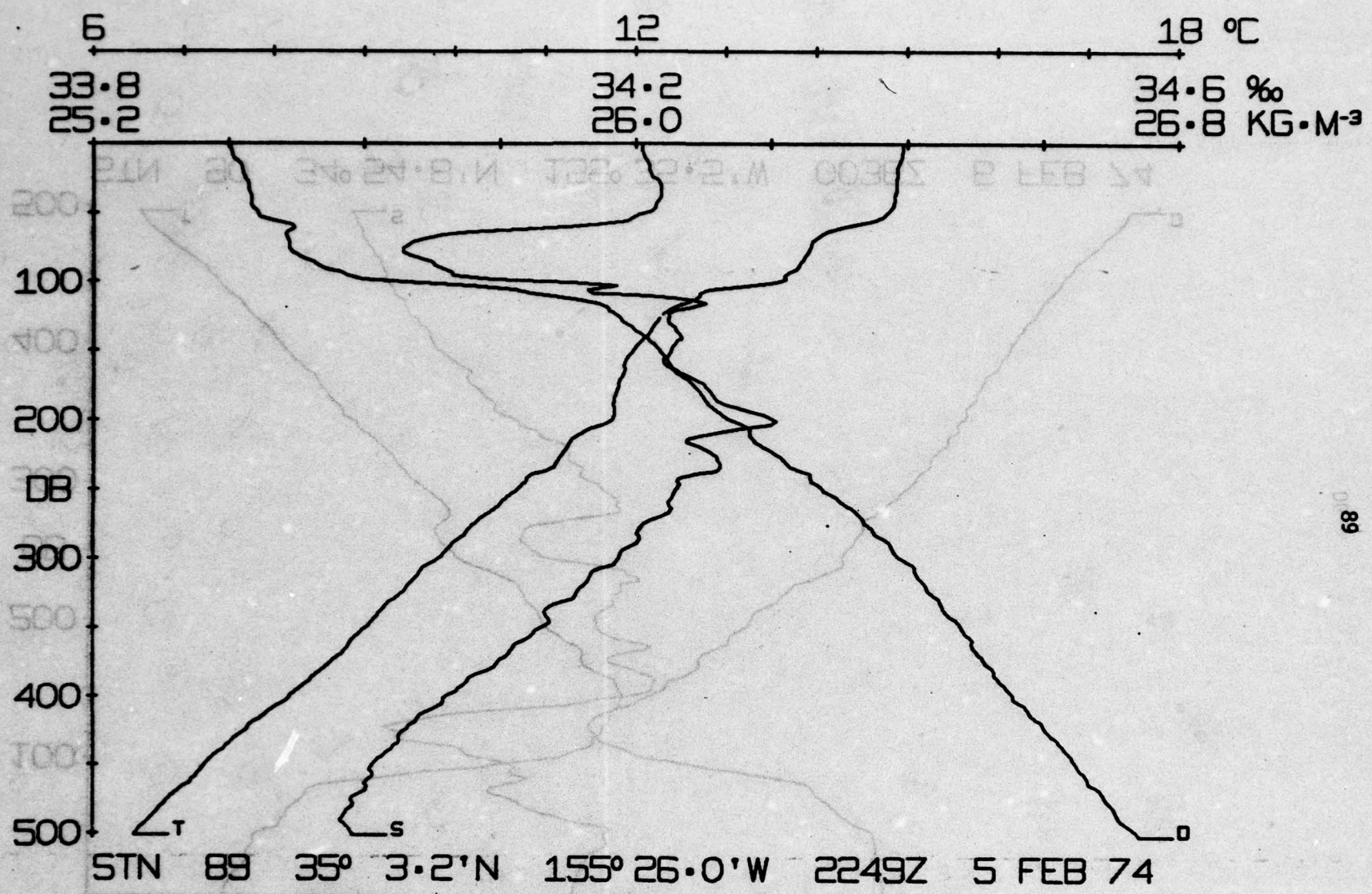
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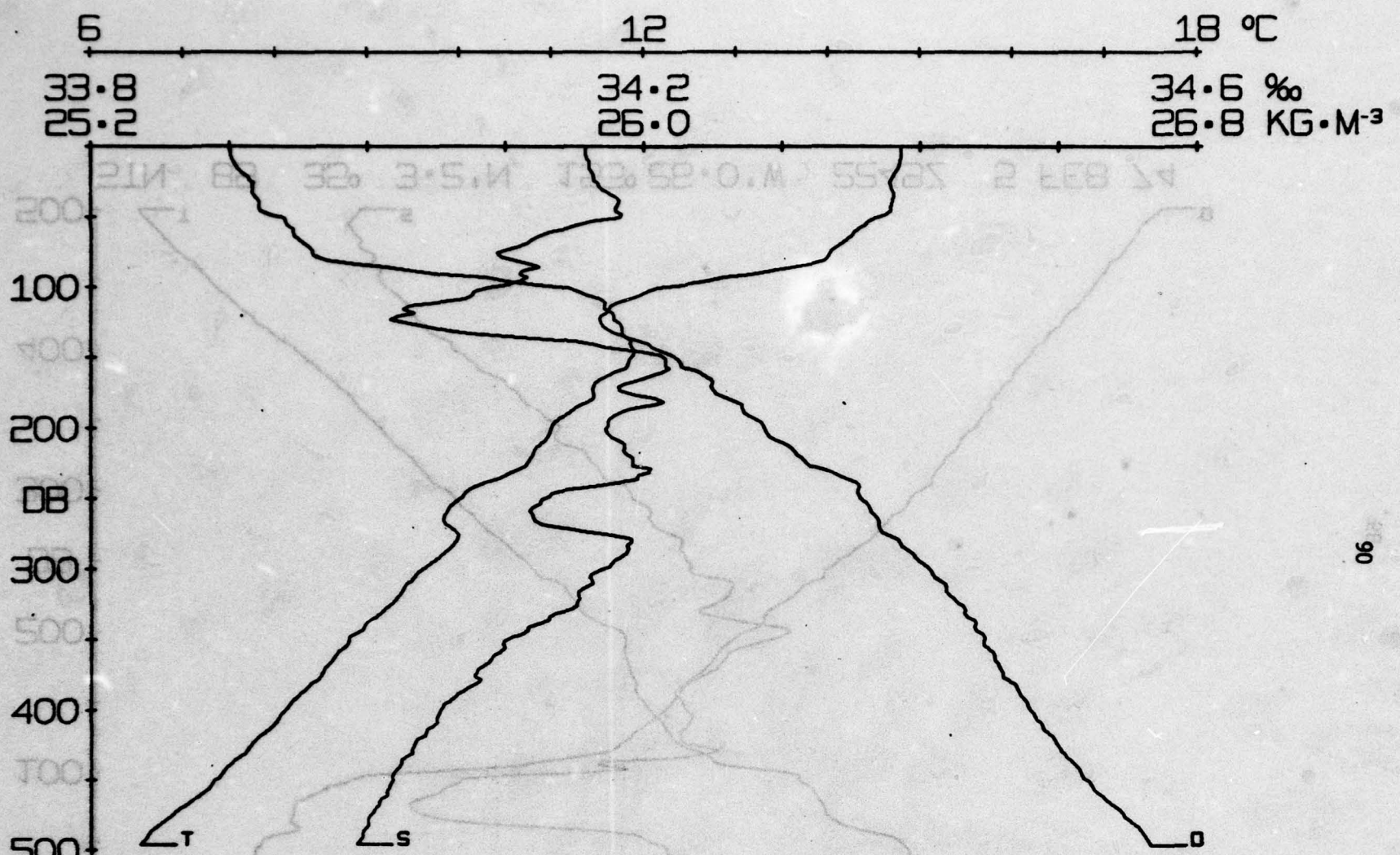
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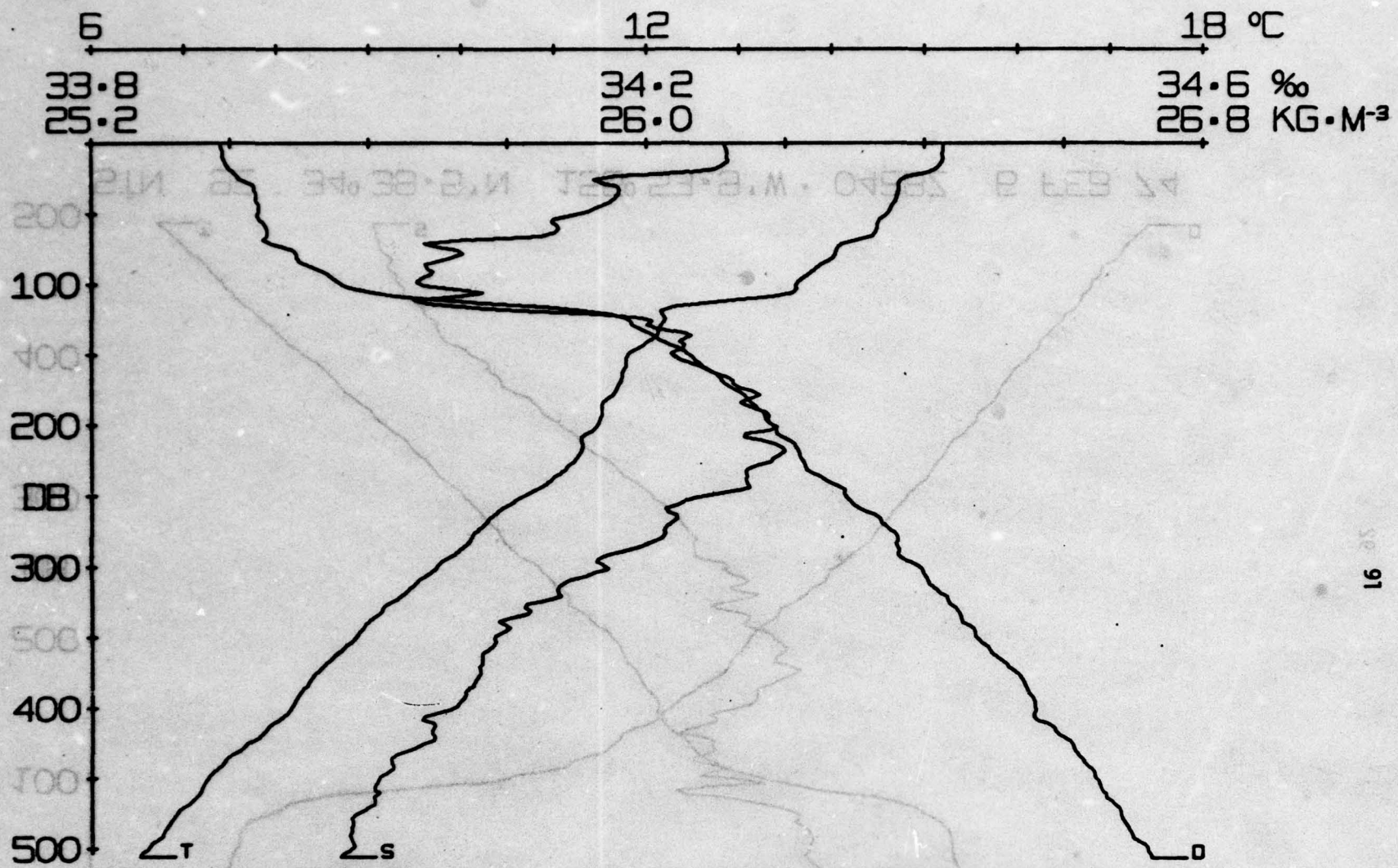
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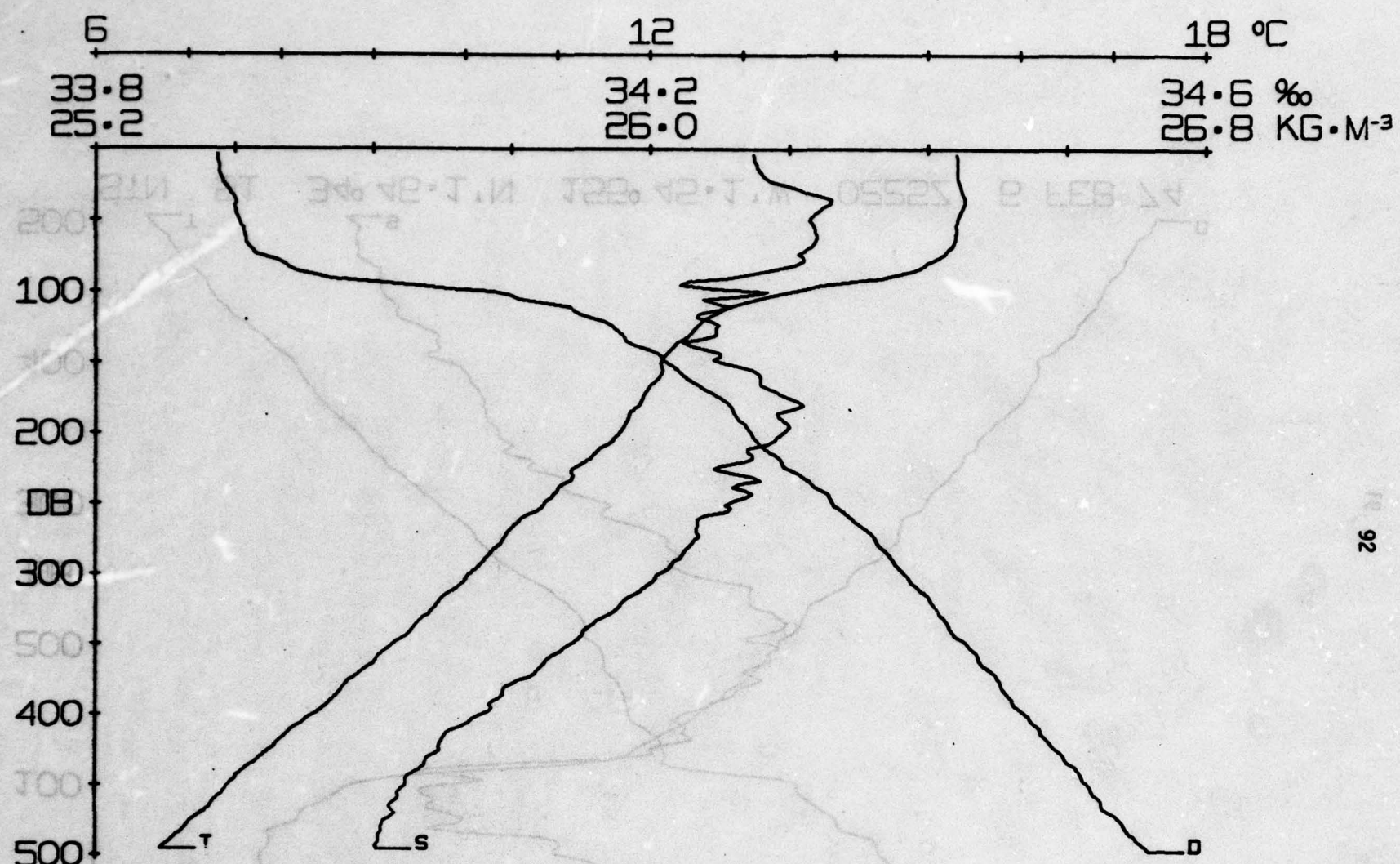
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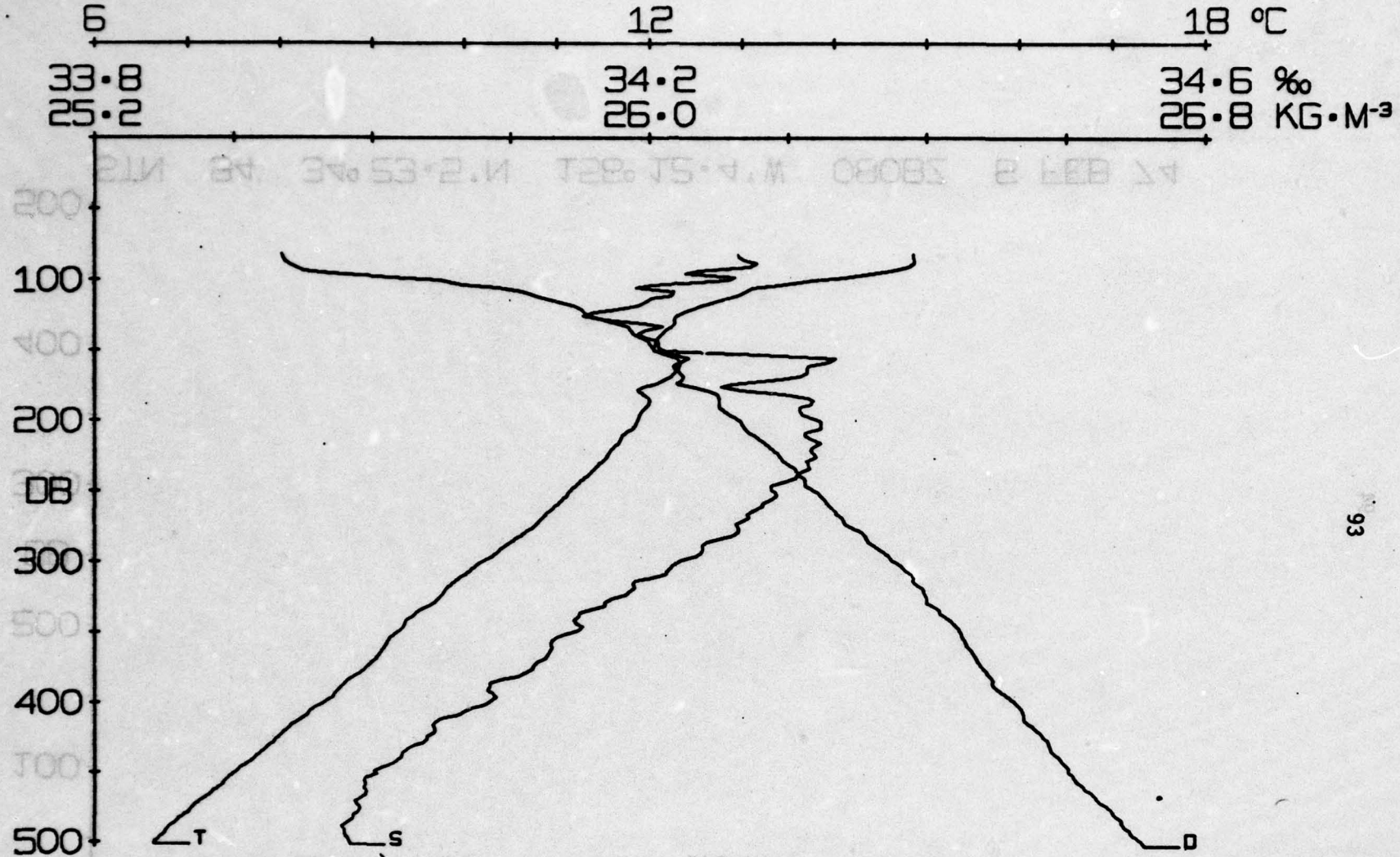
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STN 93 34° 31·6'N 156° 2·9'W 0618Z 6 FEB 74

AD-A069 062 SCRIPPS INSTITUTION OF OCEANOGRAPHY LA JOLLA CALIF F/G 8/10
VERTICAL PROFILES OF TEMPERATURE, SALINITY AND DENSITY FROM THE--ETC(U)
APR 79 R A KNOX, M J MCPHADEN

UNCLASSIFIED SIO-REF-79-6 NL

2 OF 2
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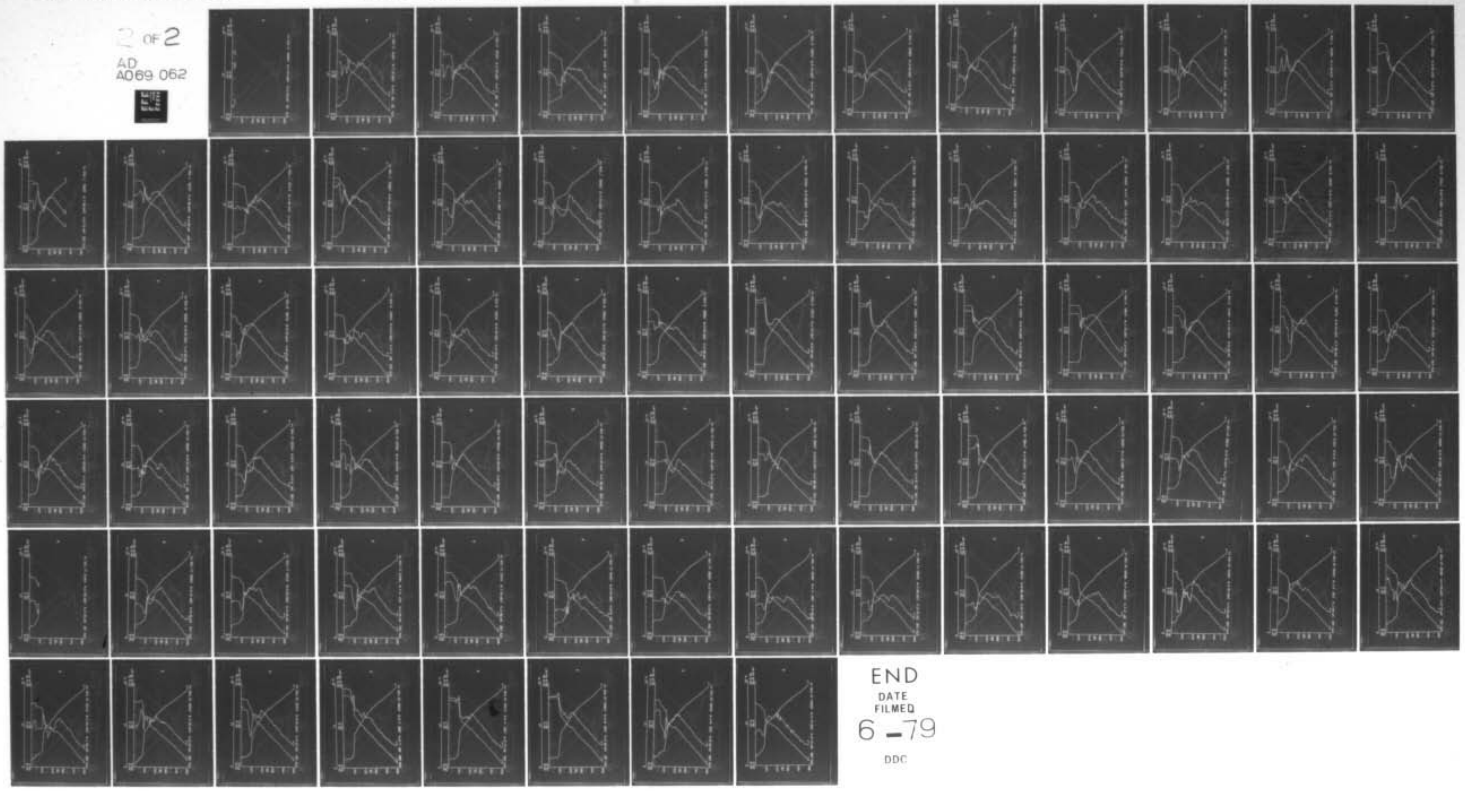

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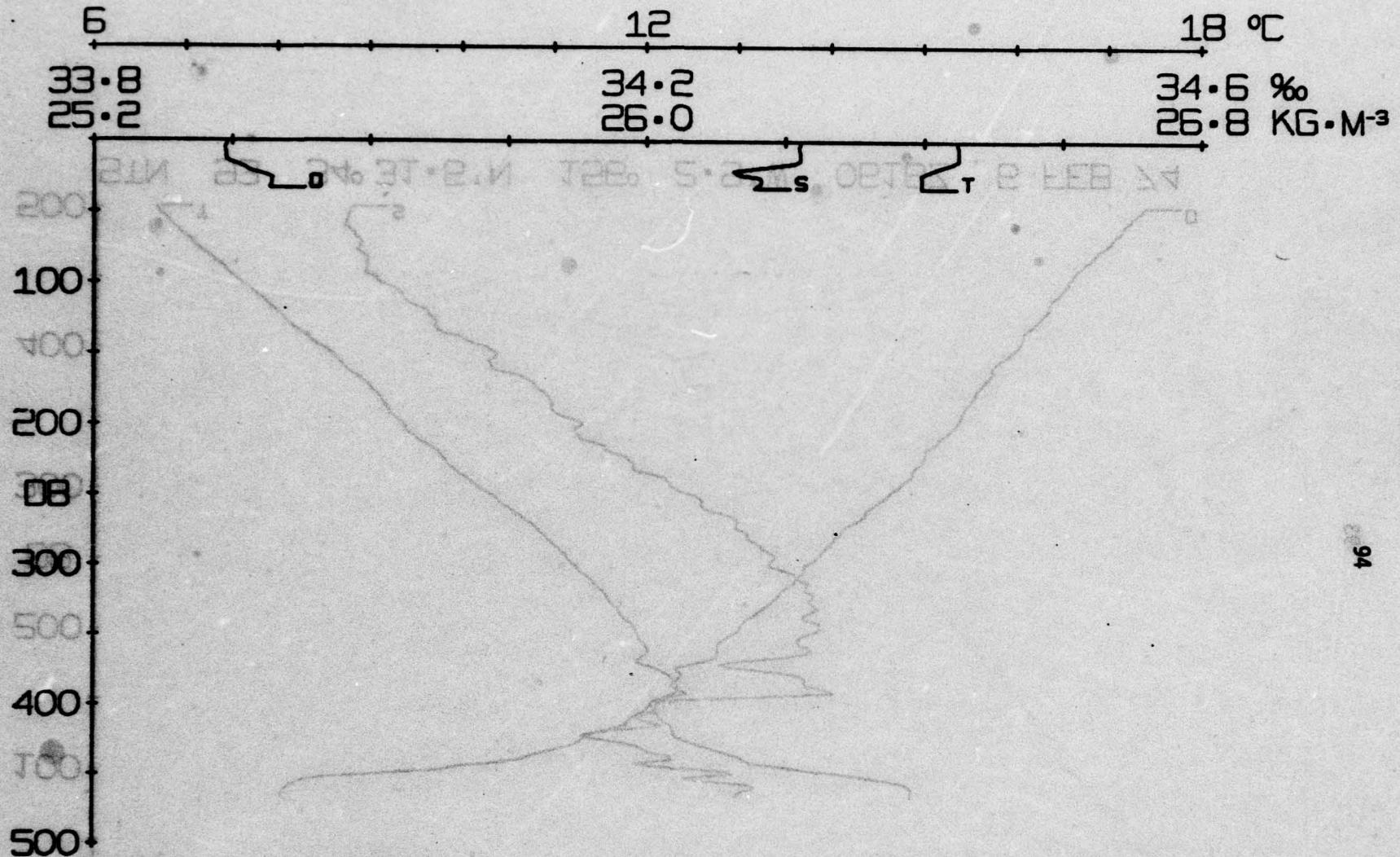

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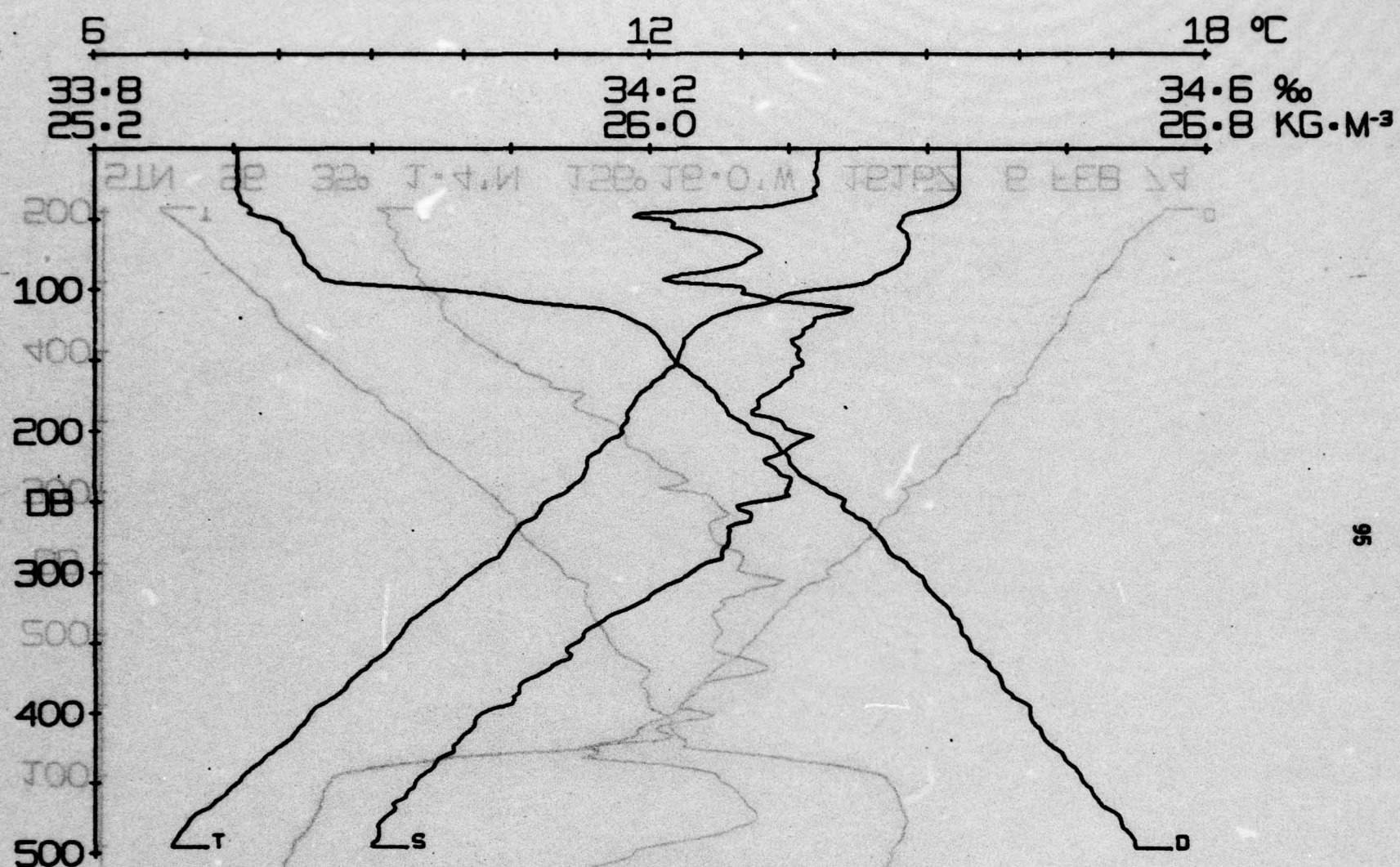
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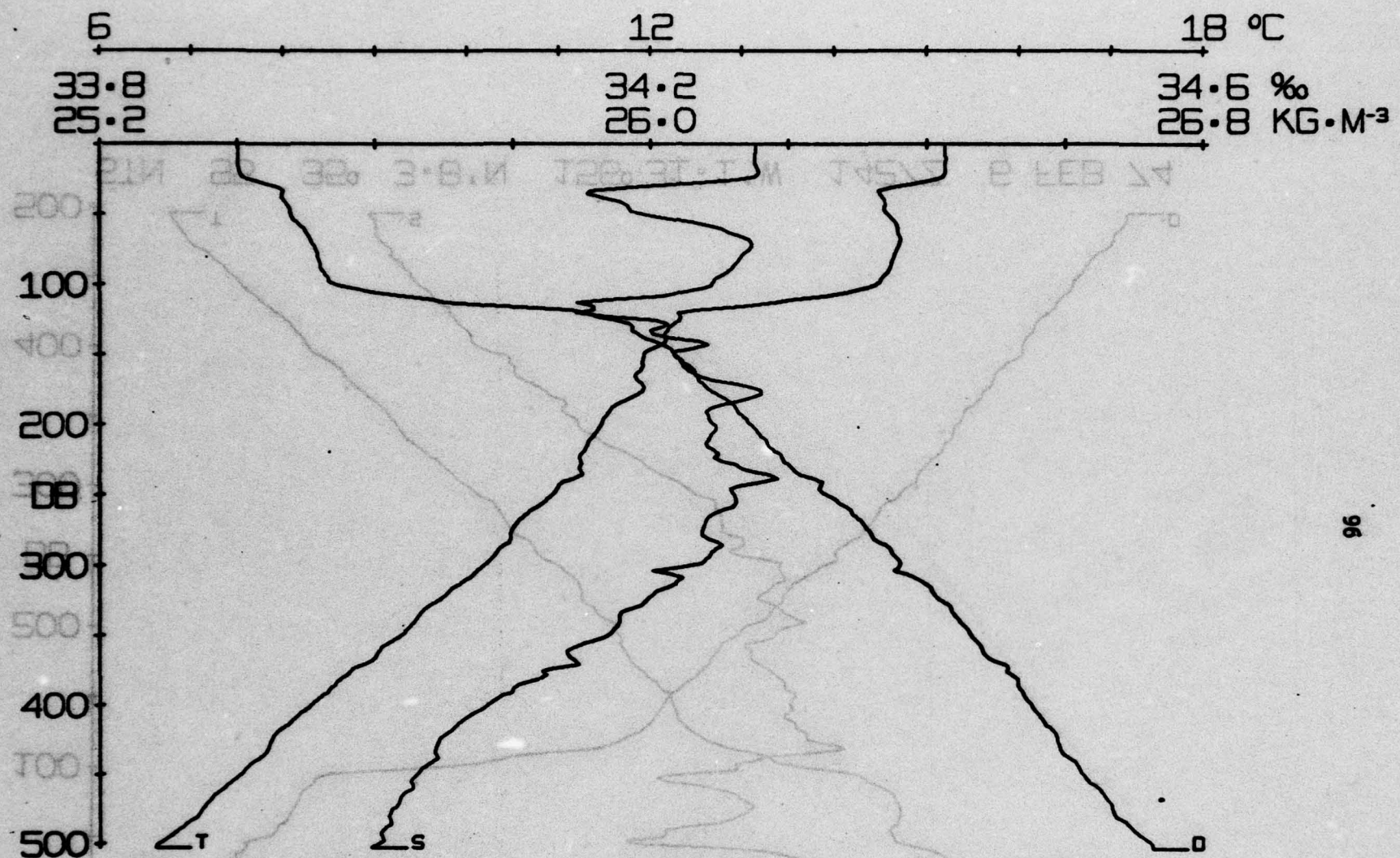
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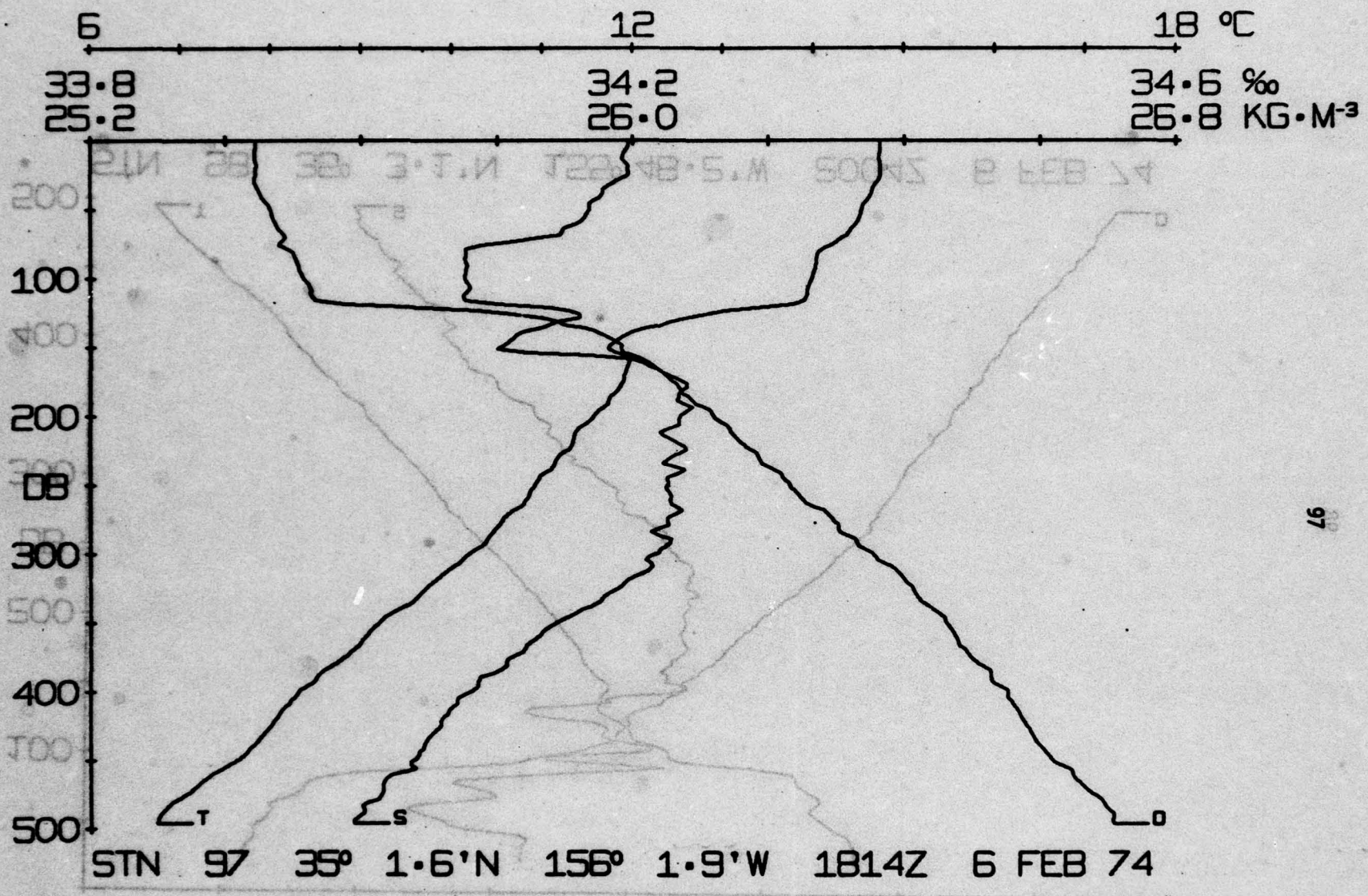
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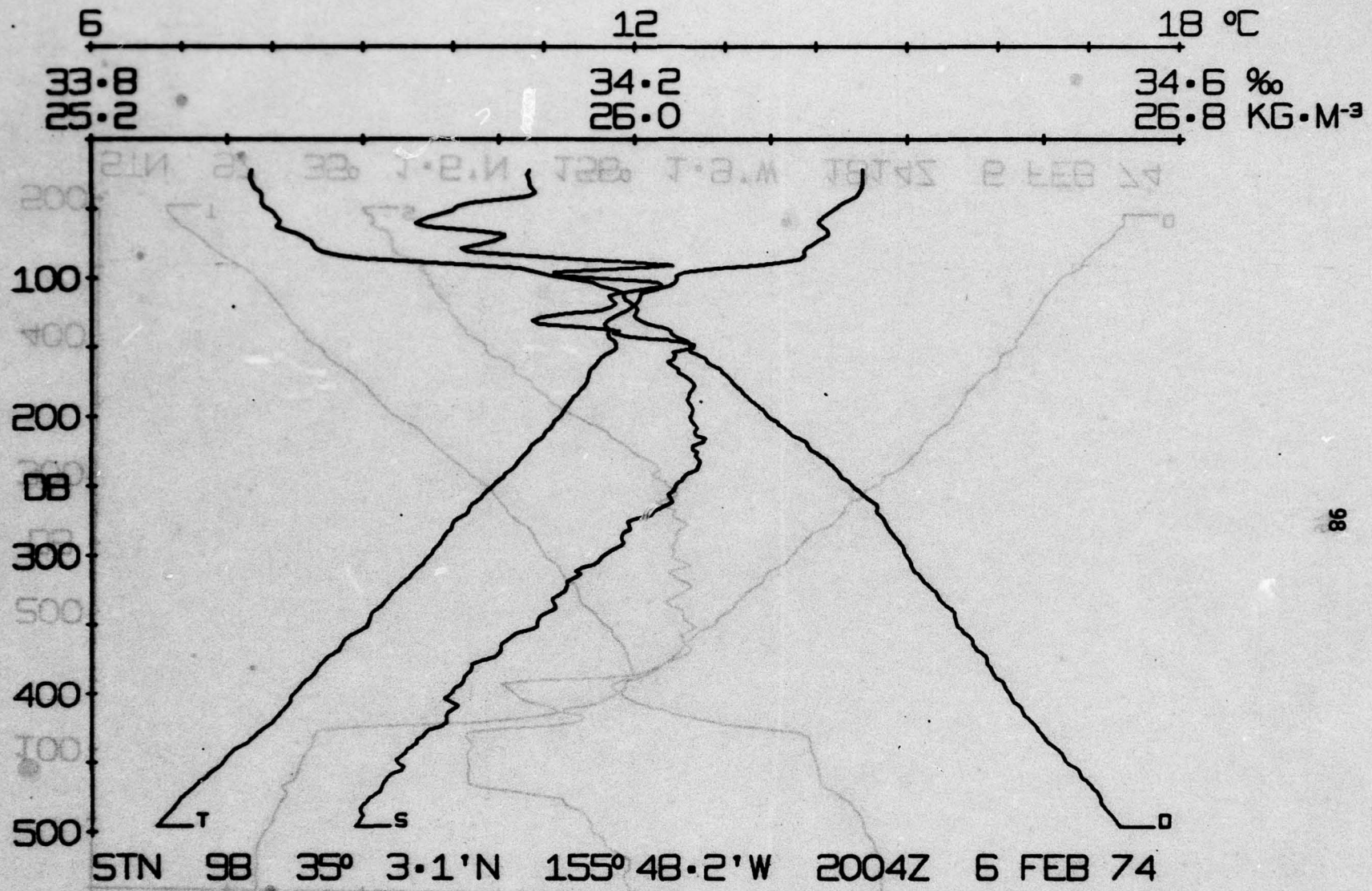
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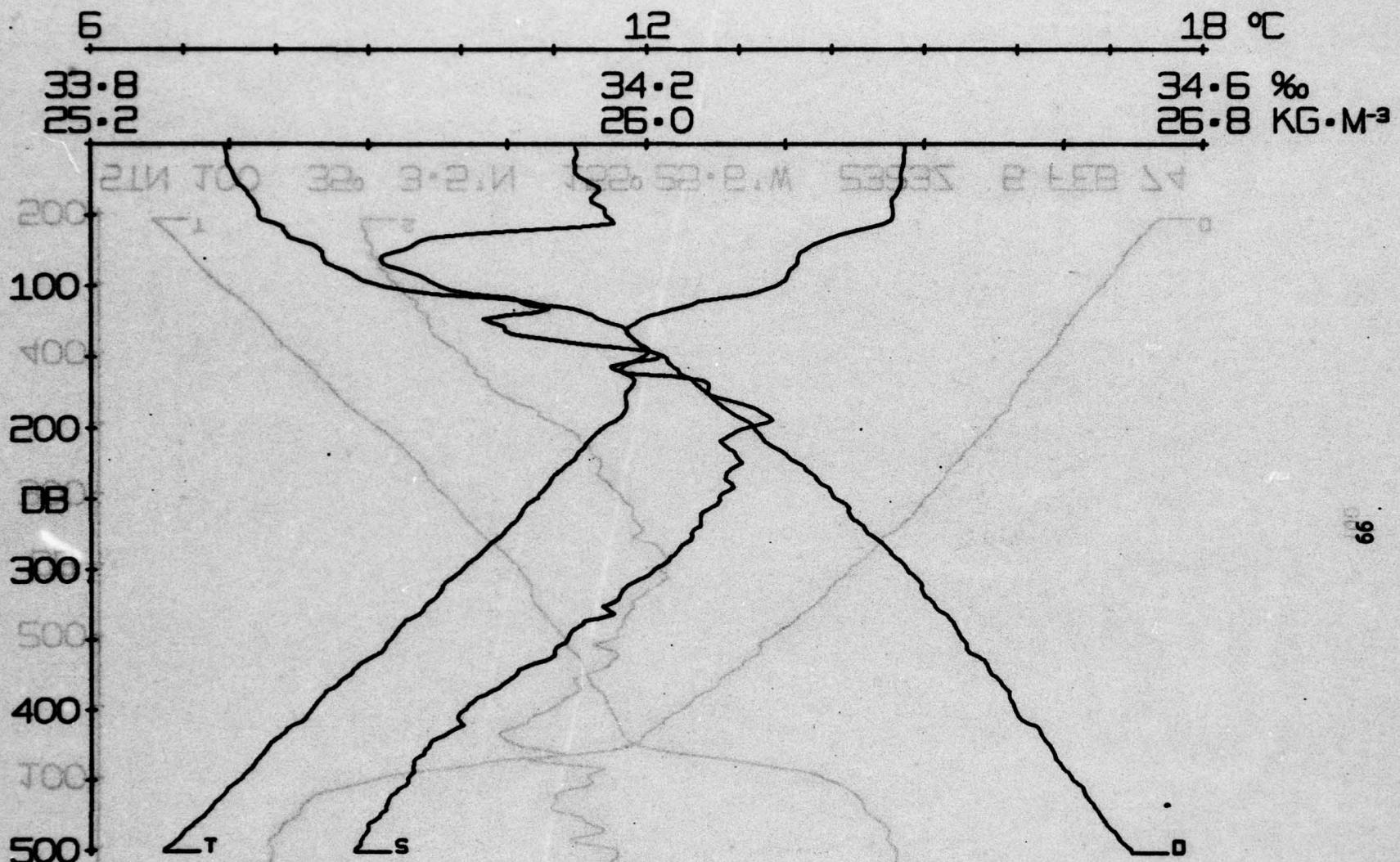
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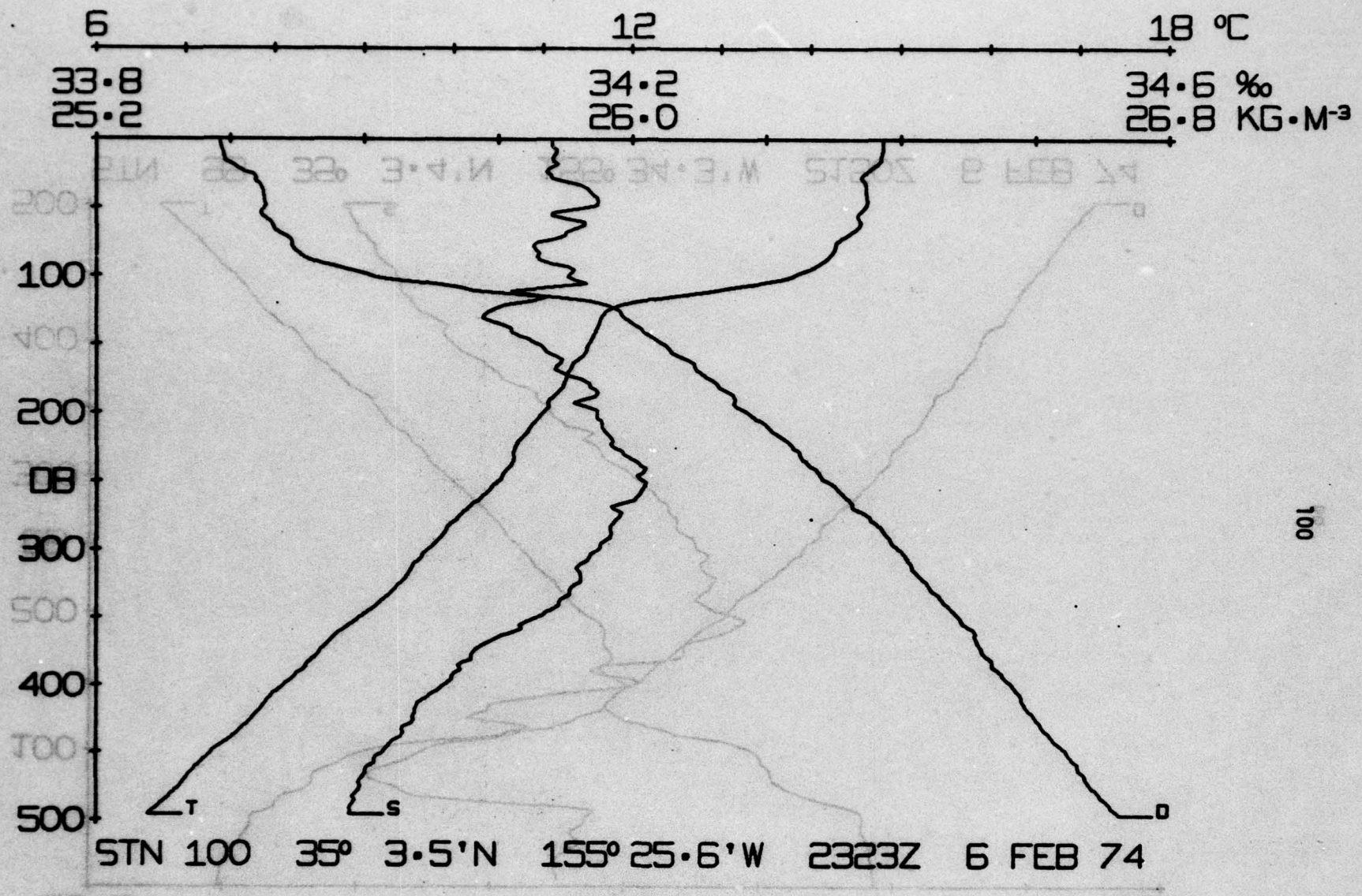
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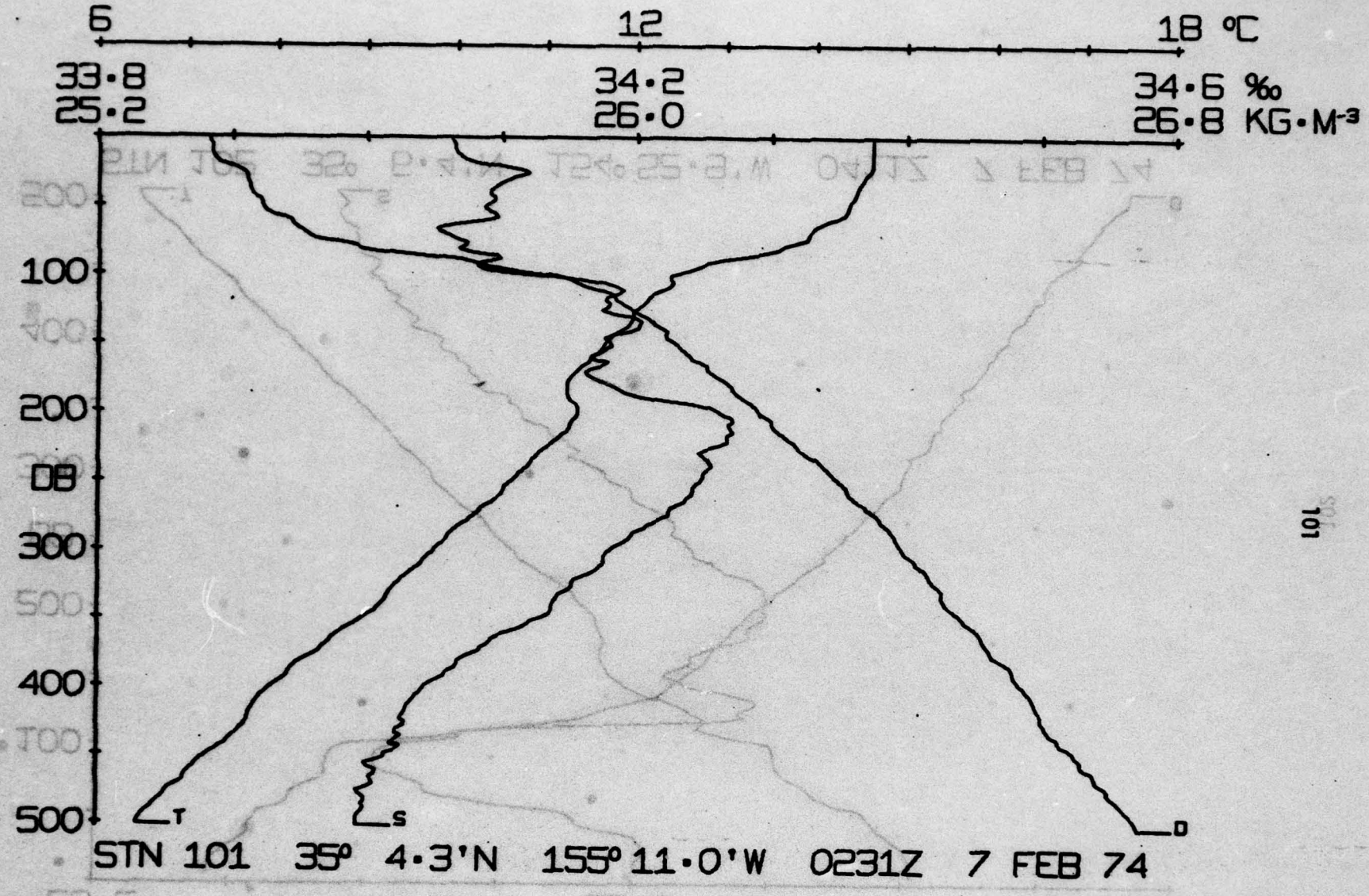
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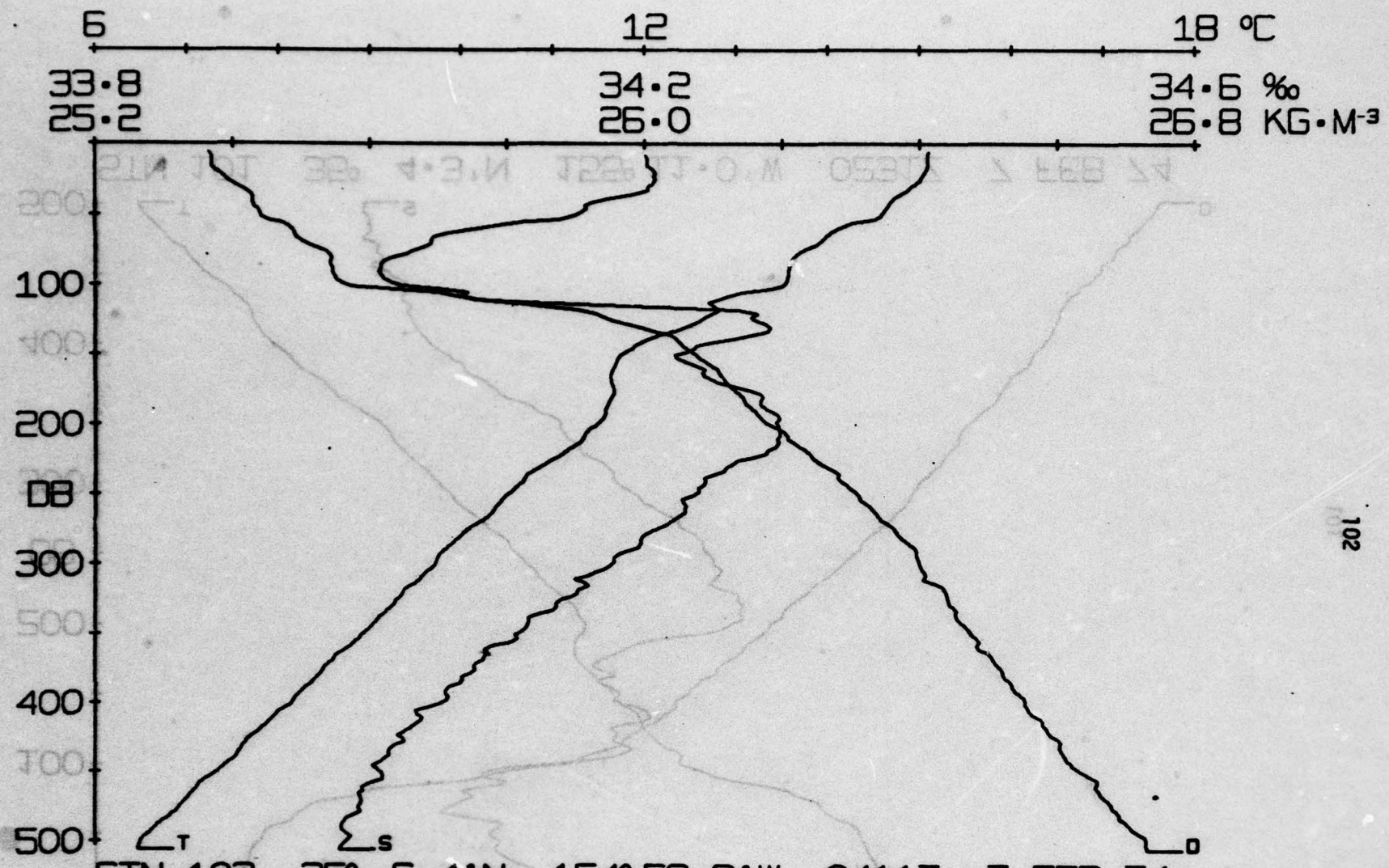
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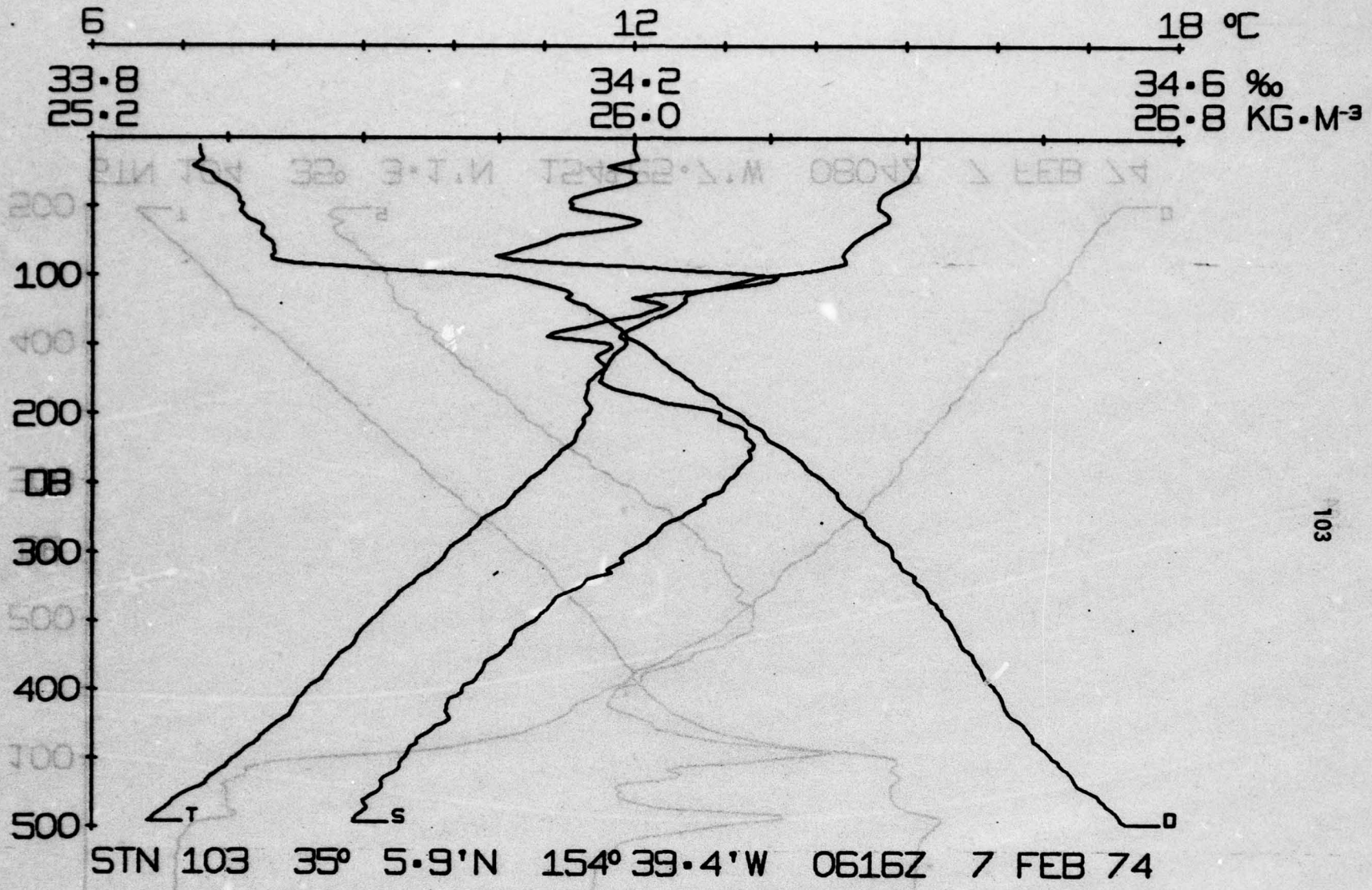
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103
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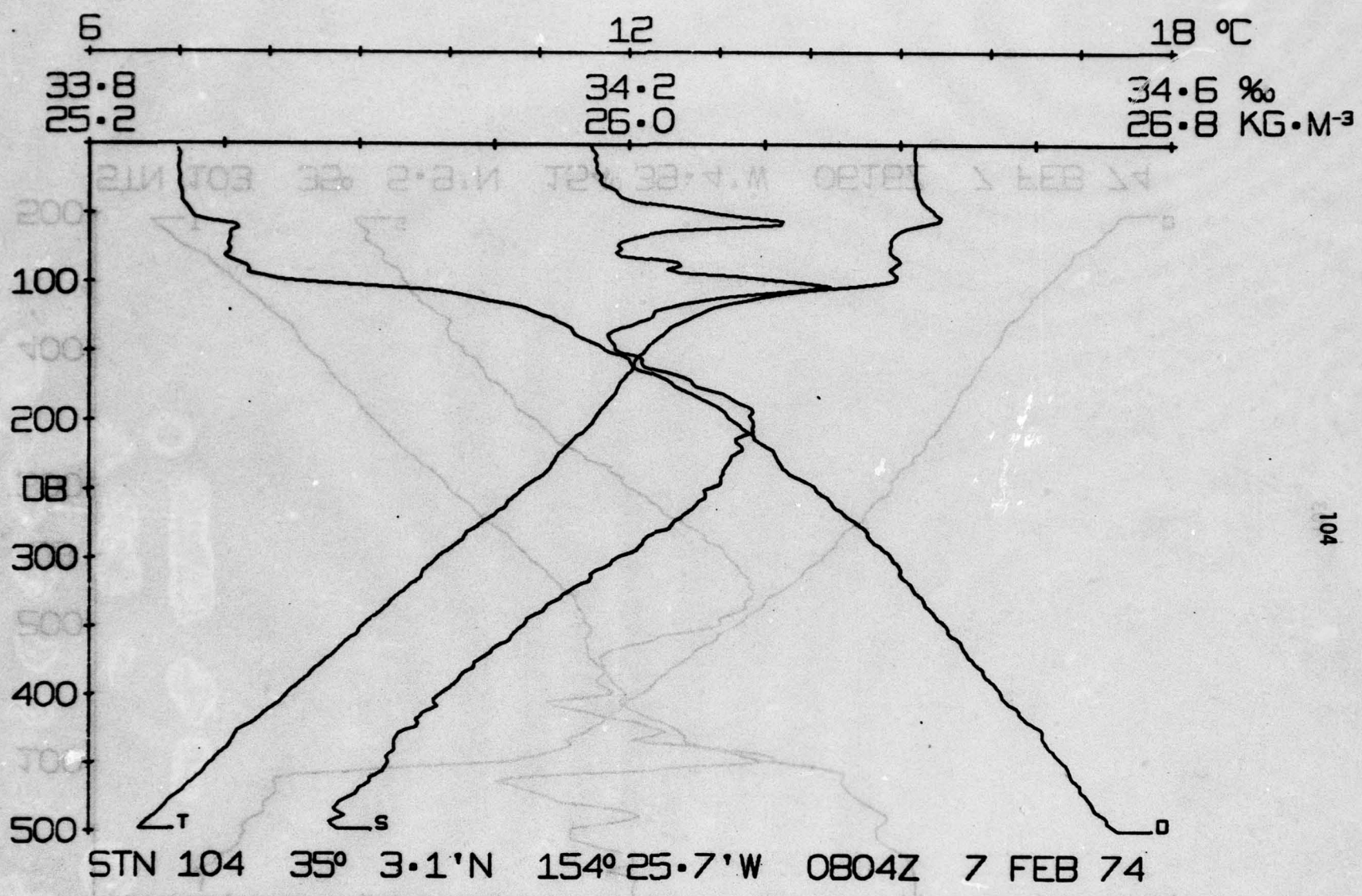
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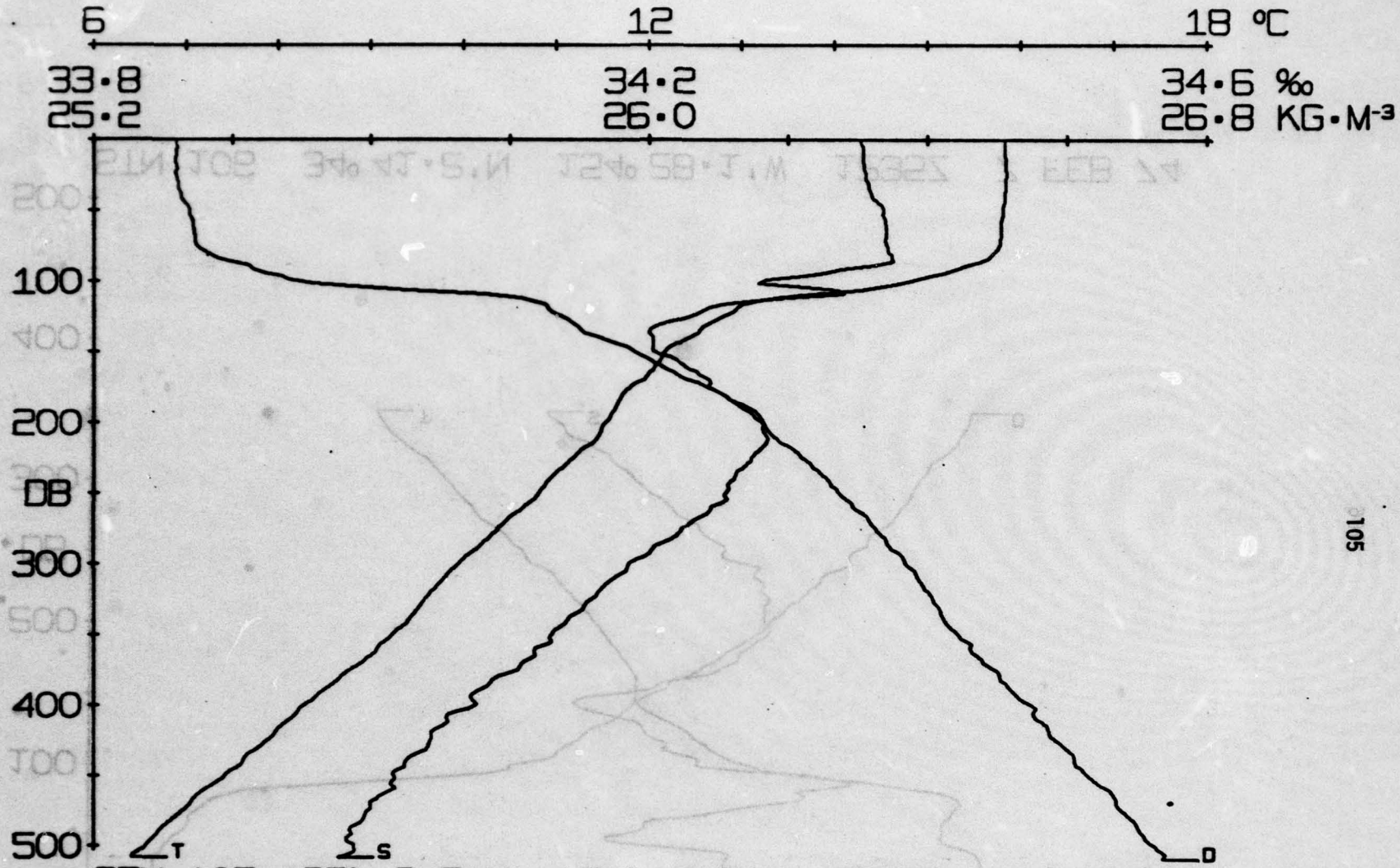
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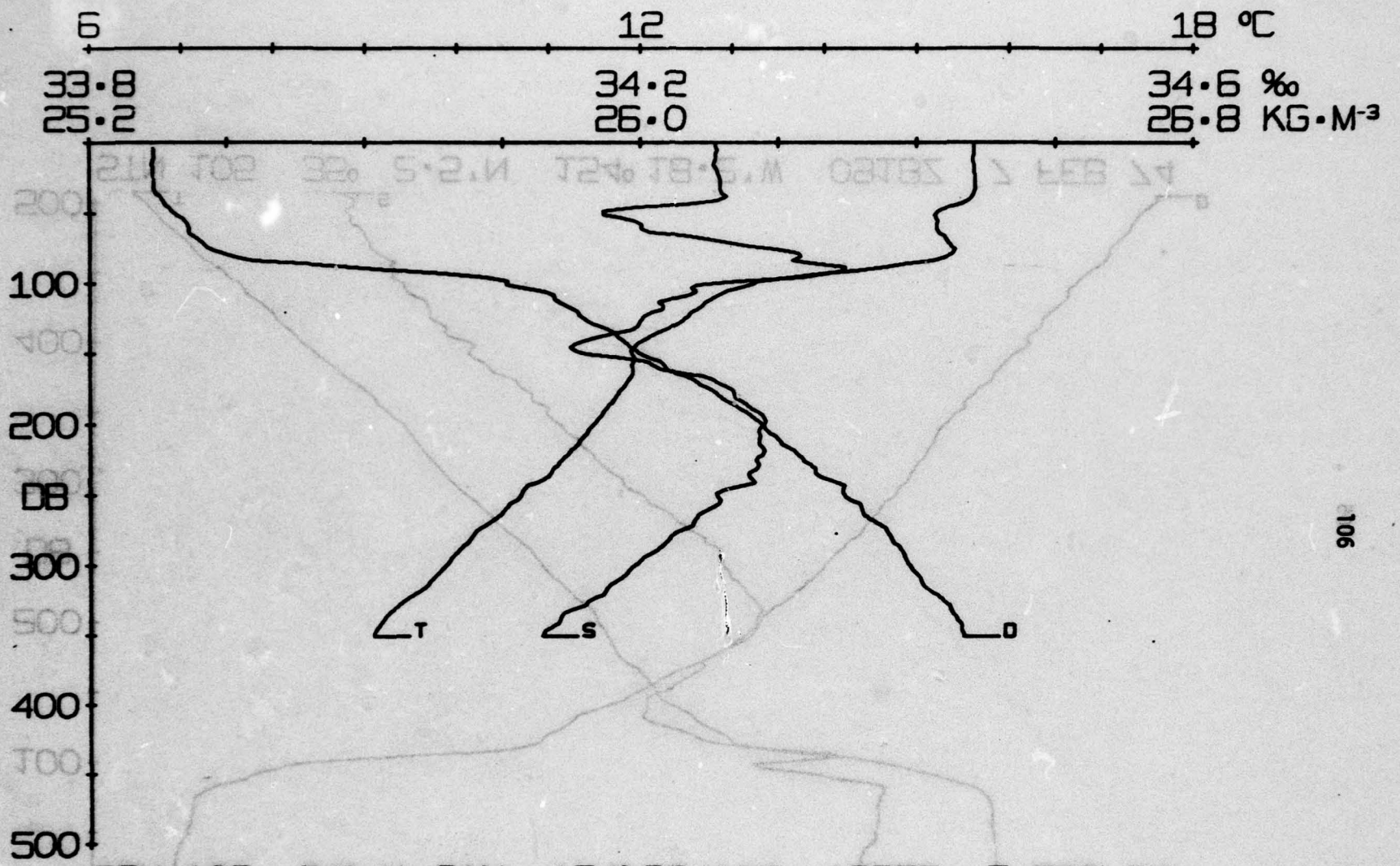

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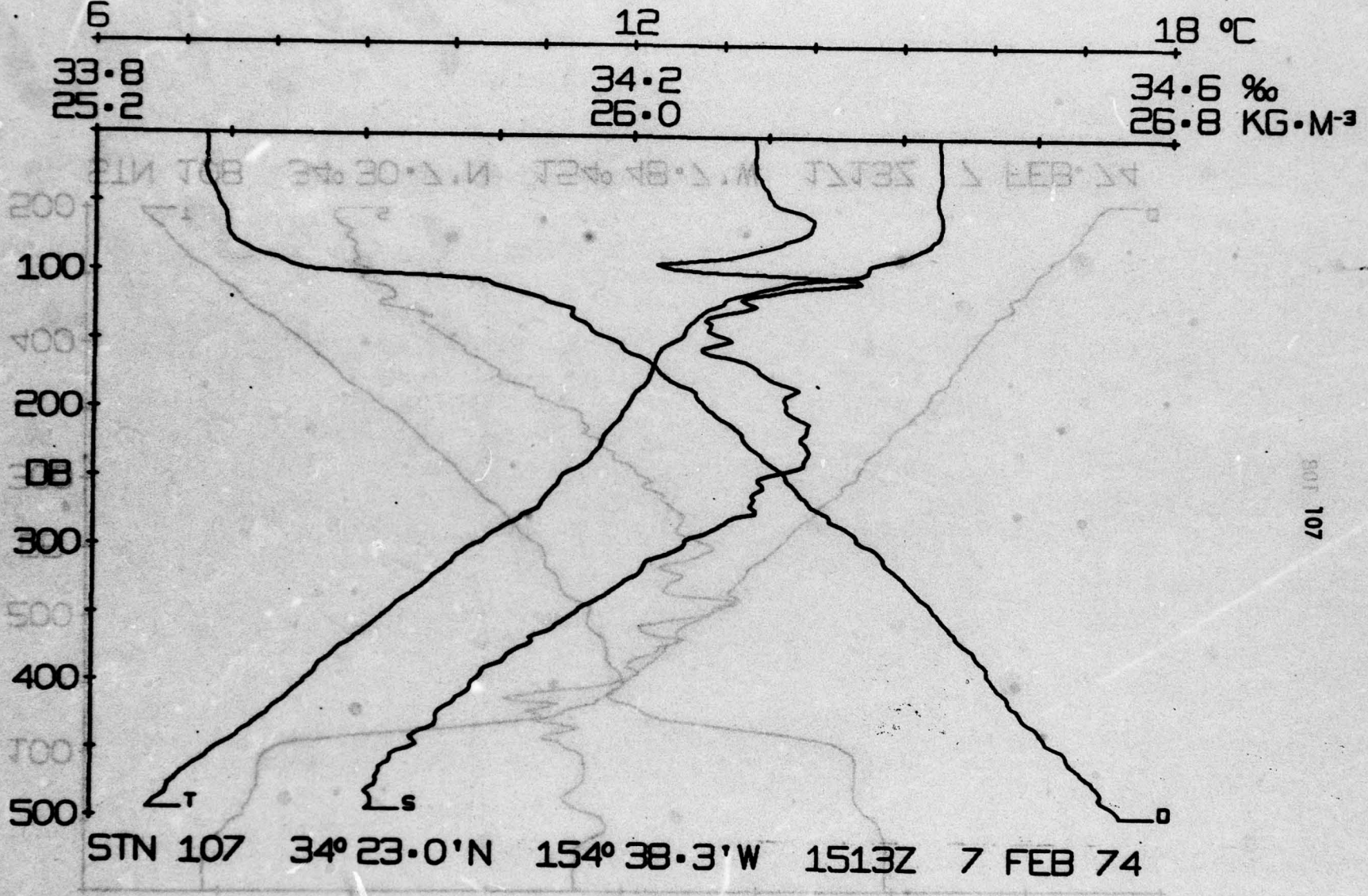
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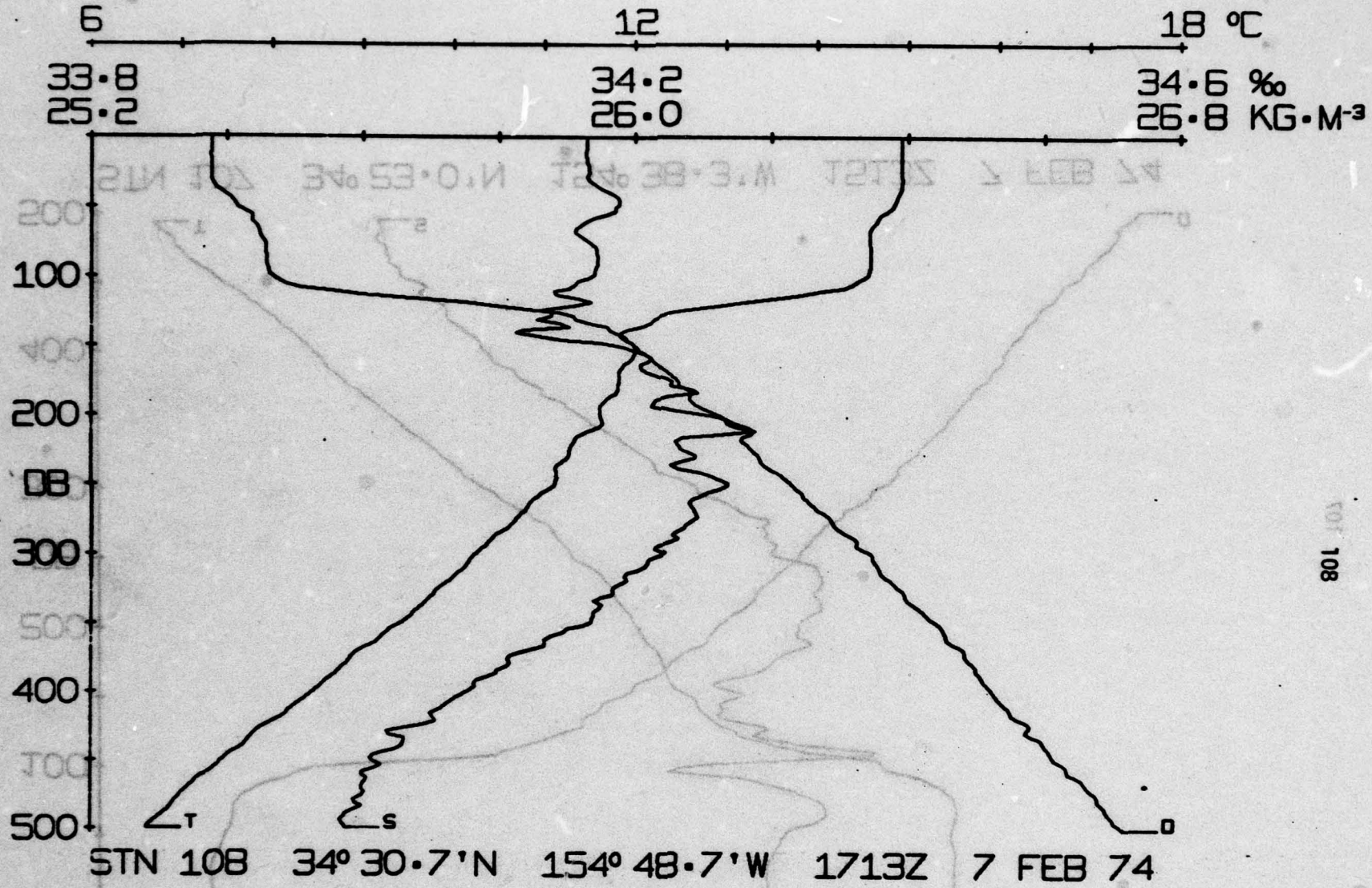
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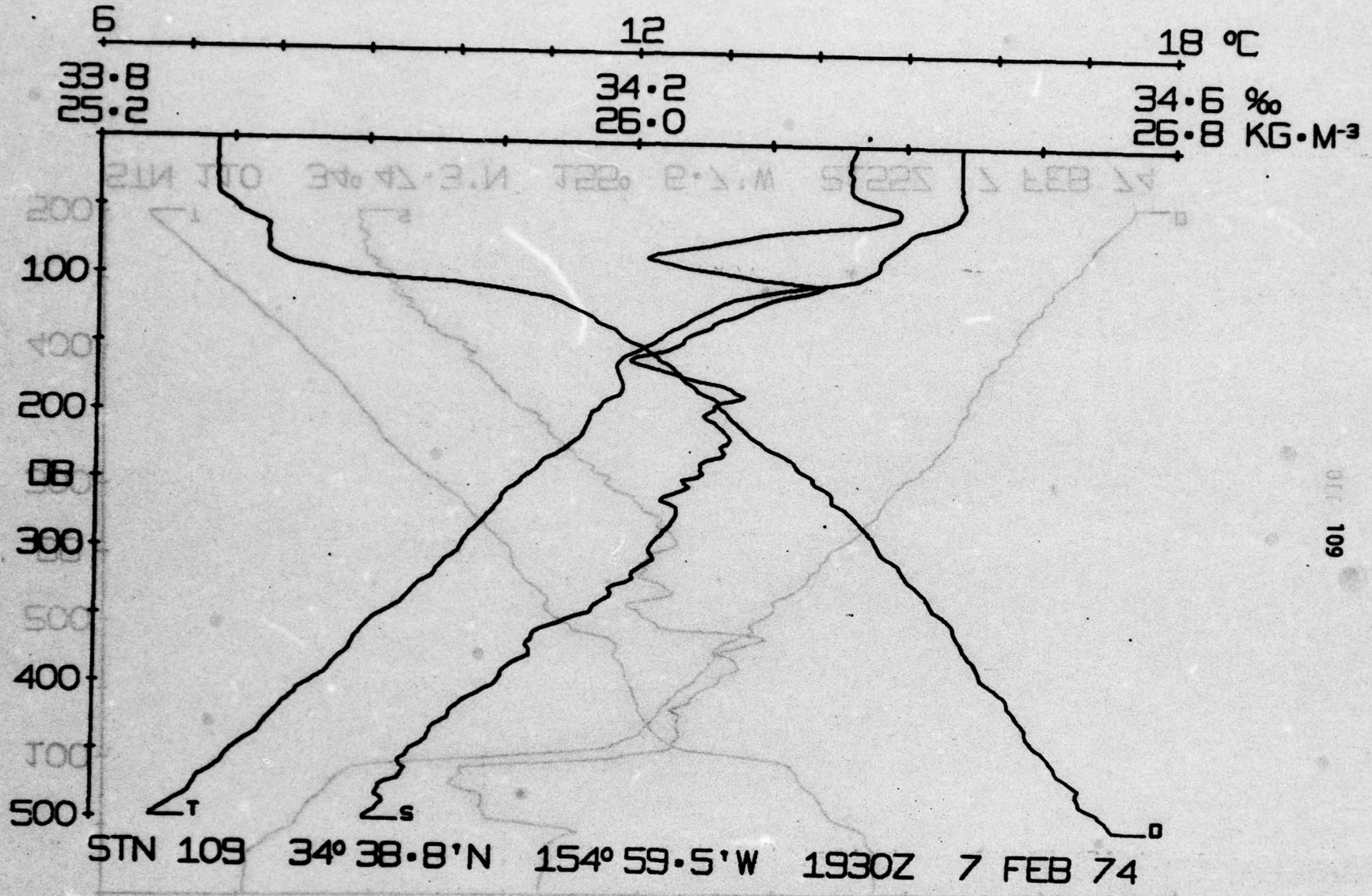
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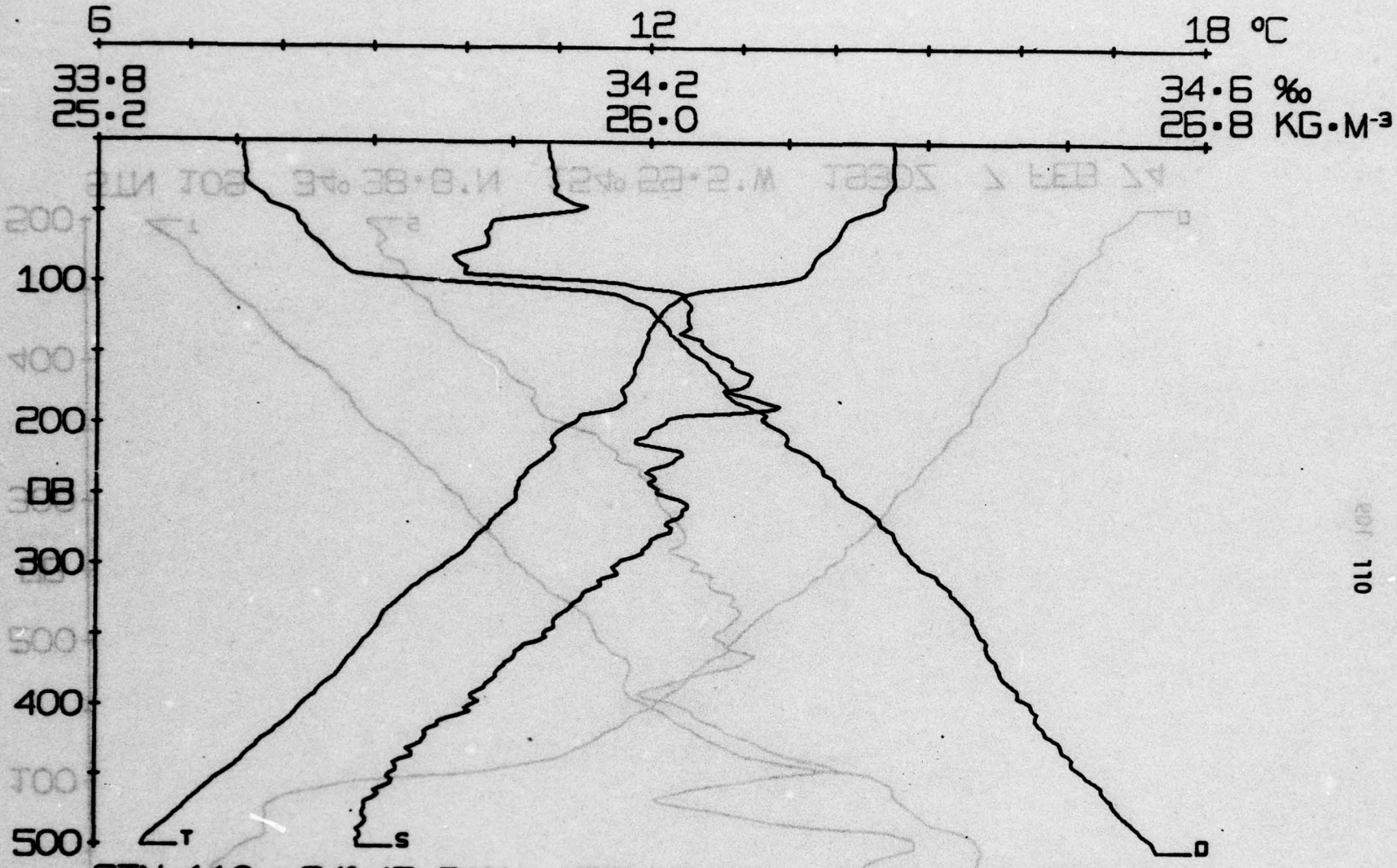
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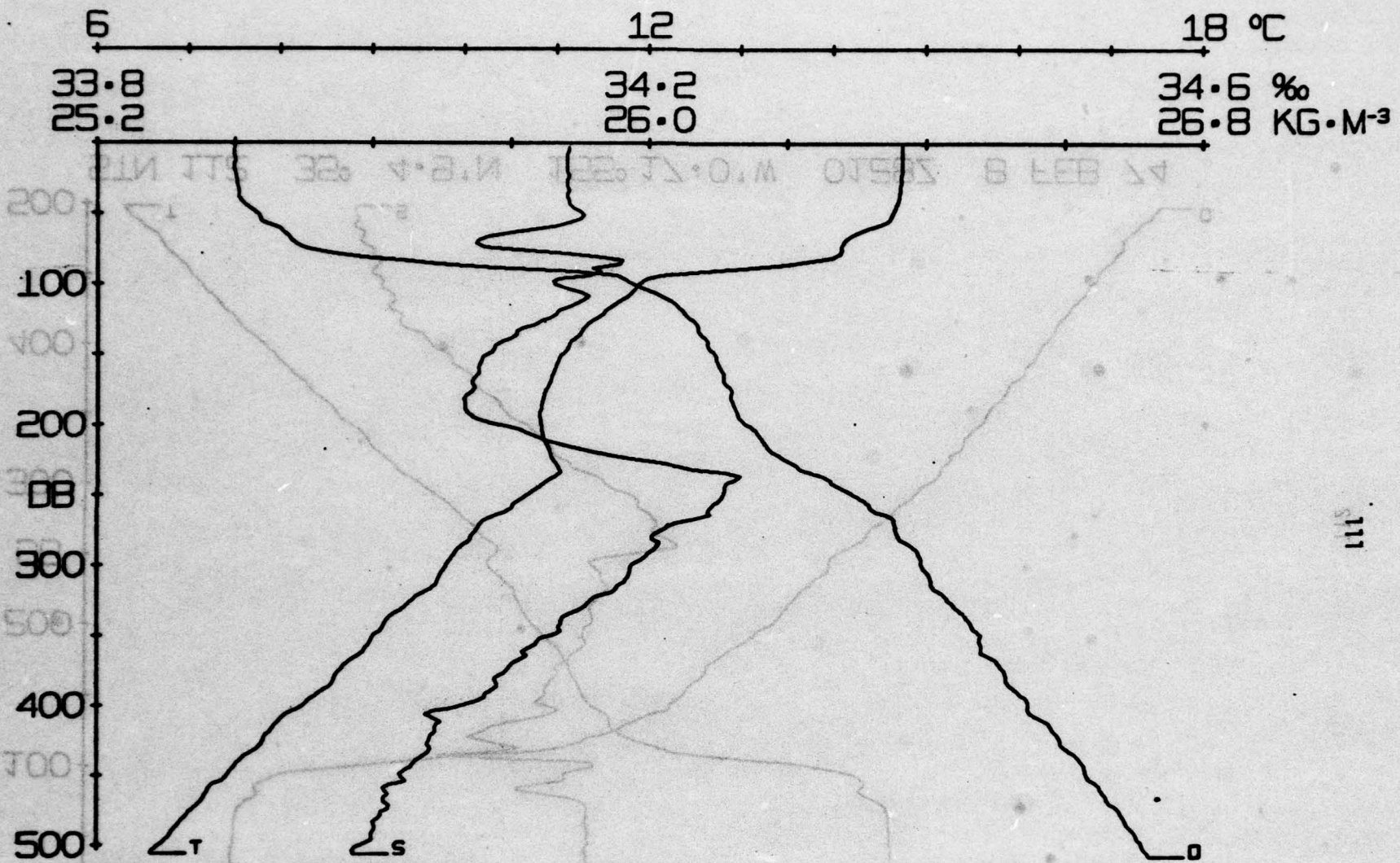
S
D
STN 110 34° 47·3'N 155° 6·7'W 2155Z 7 FEB 74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18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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200
DB
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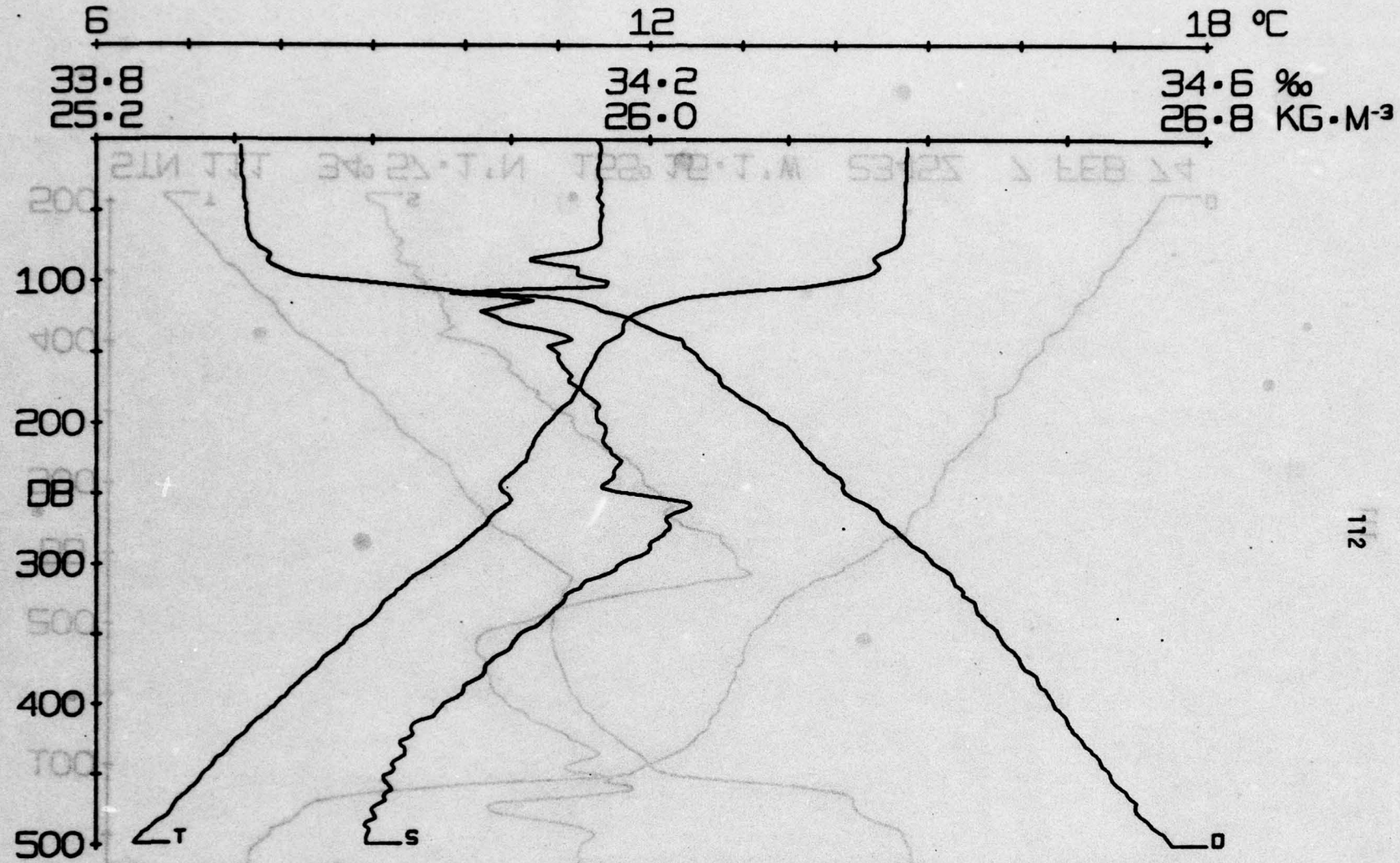
400
500
T
S
D
STN 111 34° 57·1'N 155° 15·1'W 2345Z 7 FEB 74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26·8 KG·M⁻³
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T
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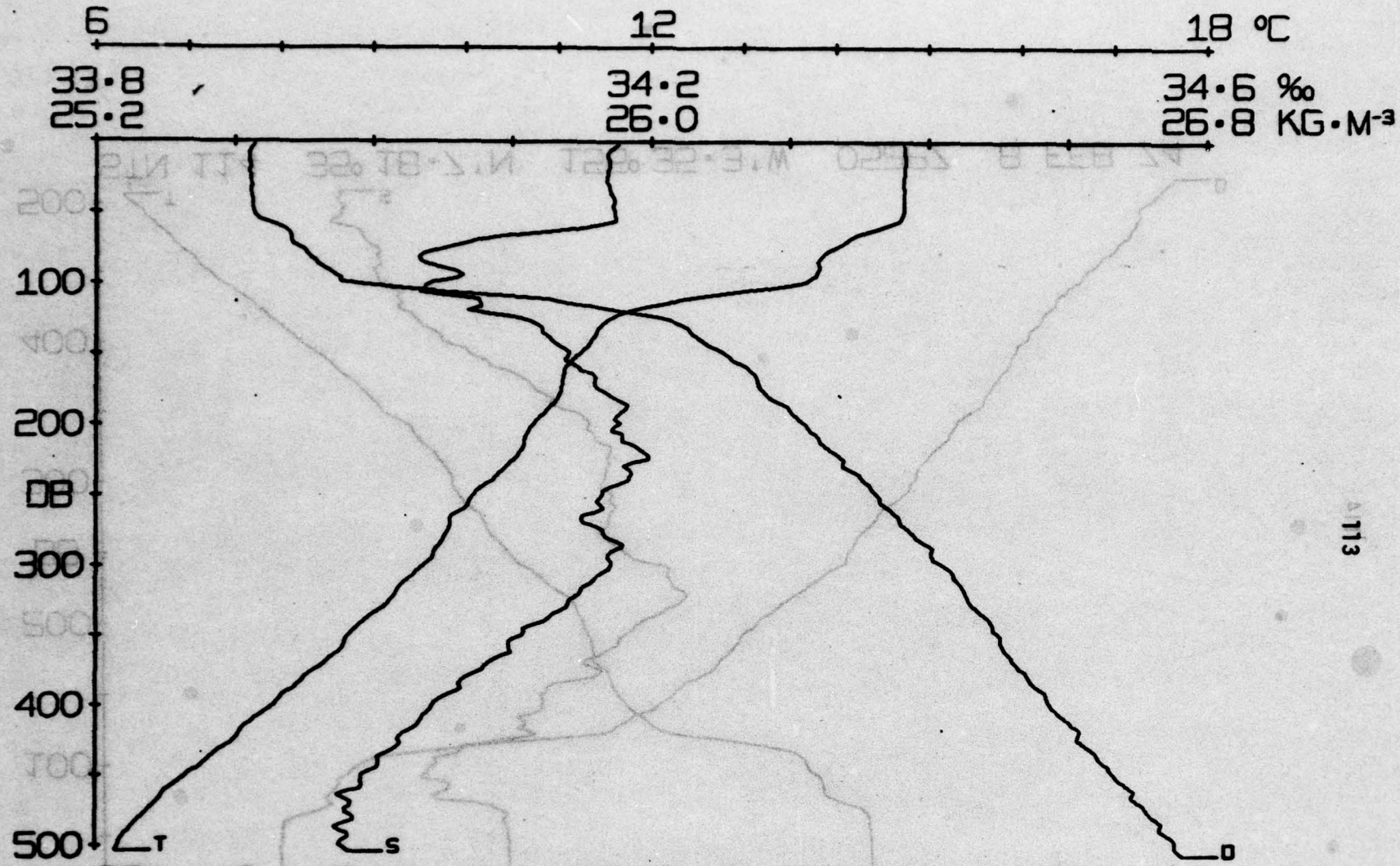
D
112
STN 112 35° 4·9'N 155° 17·0'W 0129Z 8 FEB 74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25·2
26·0
26·8 KG·M⁻³
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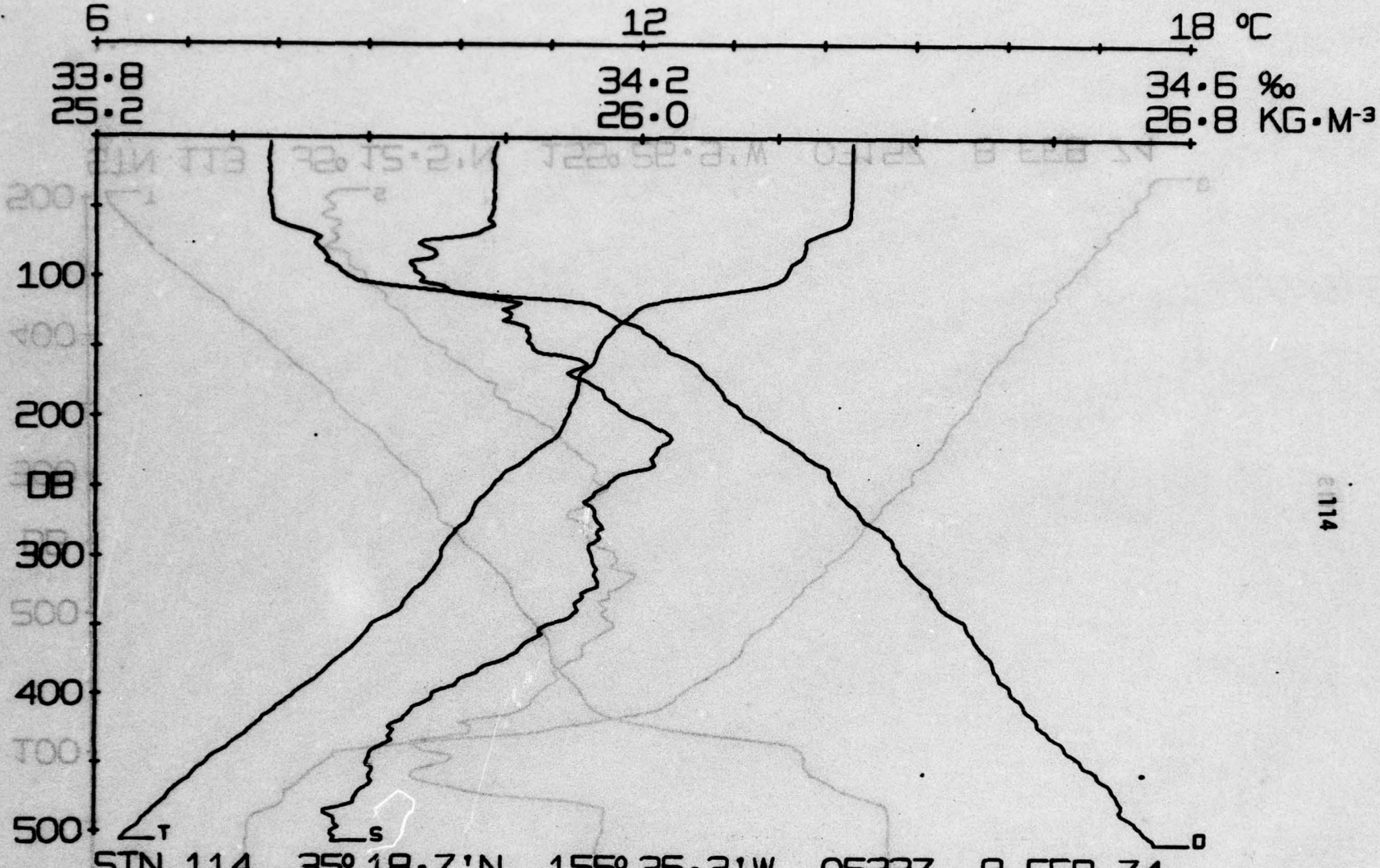
400
500
T
S
D
113
STN 113 35° 12·5'N 155° 26·9'W 0315Z 8 FEB 74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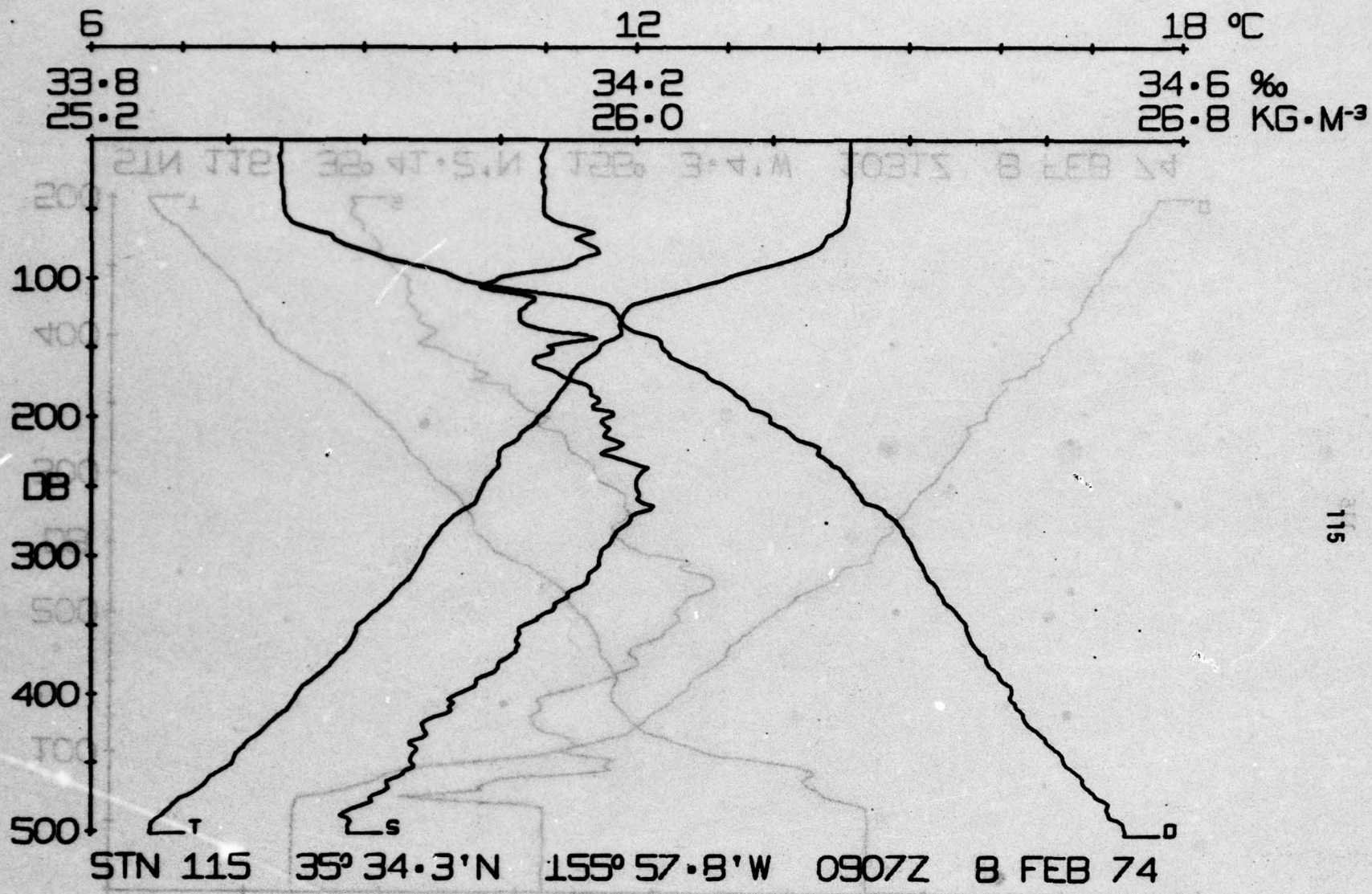
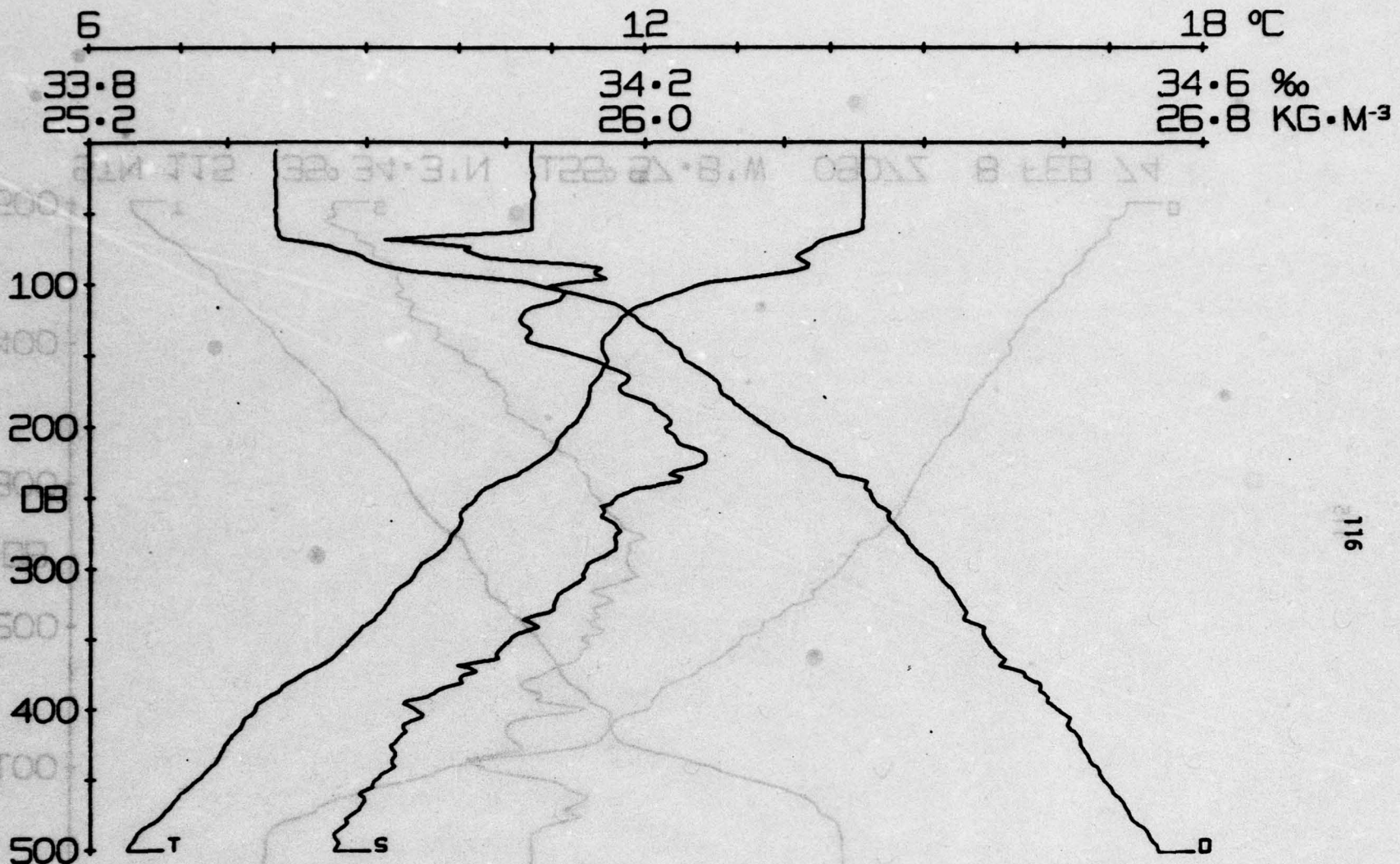
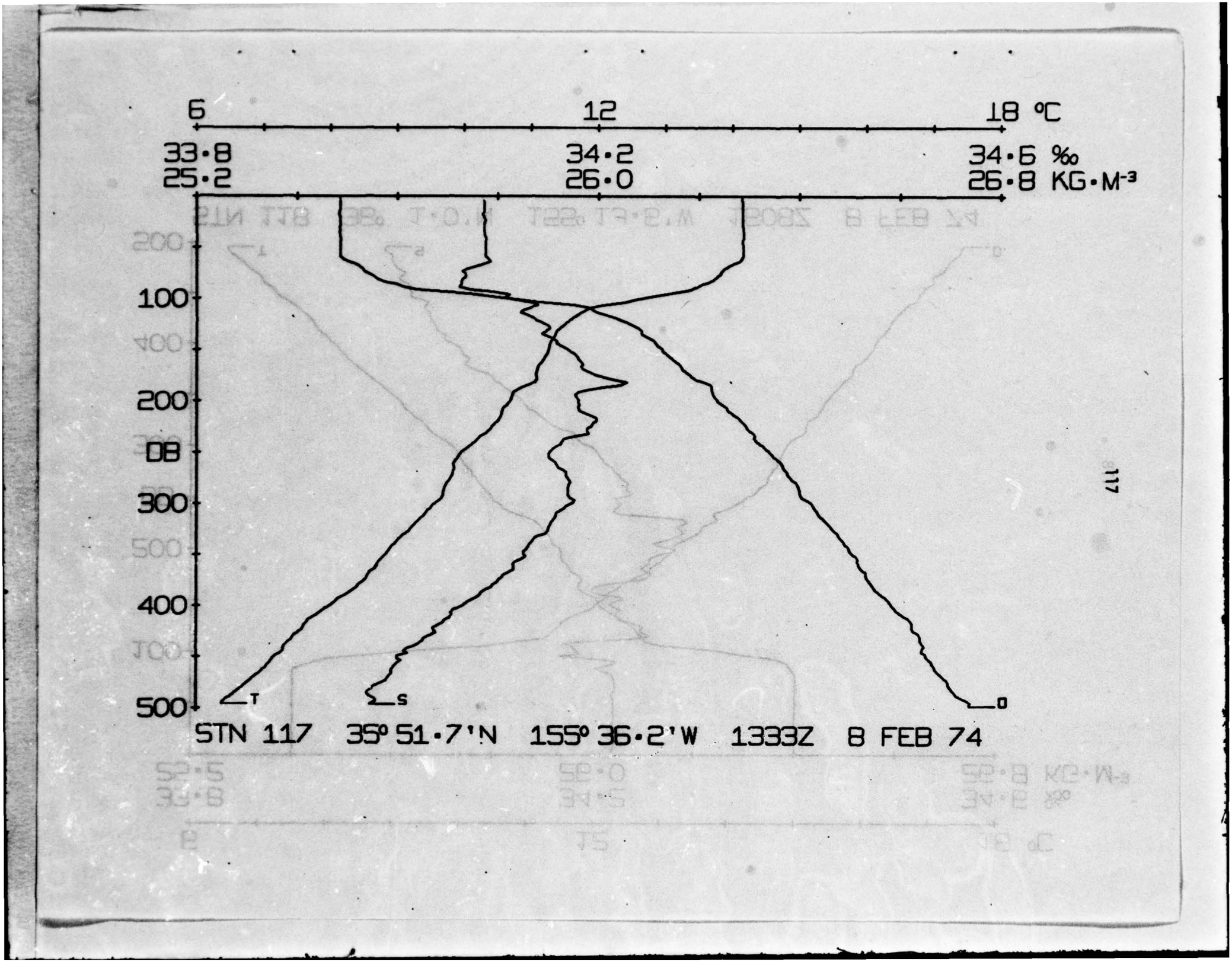
T
S
D
114
STN 114 35° 18·7'N 155° 35·3'W 0522Z 8 FEB 74



STN 115 35° 34·3'N 155° 57·8'W 0907Z 8 FEB 74



STN 116 35° 41·2'N 156° 3·4'W 1031Z 8 FEB 74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26·0
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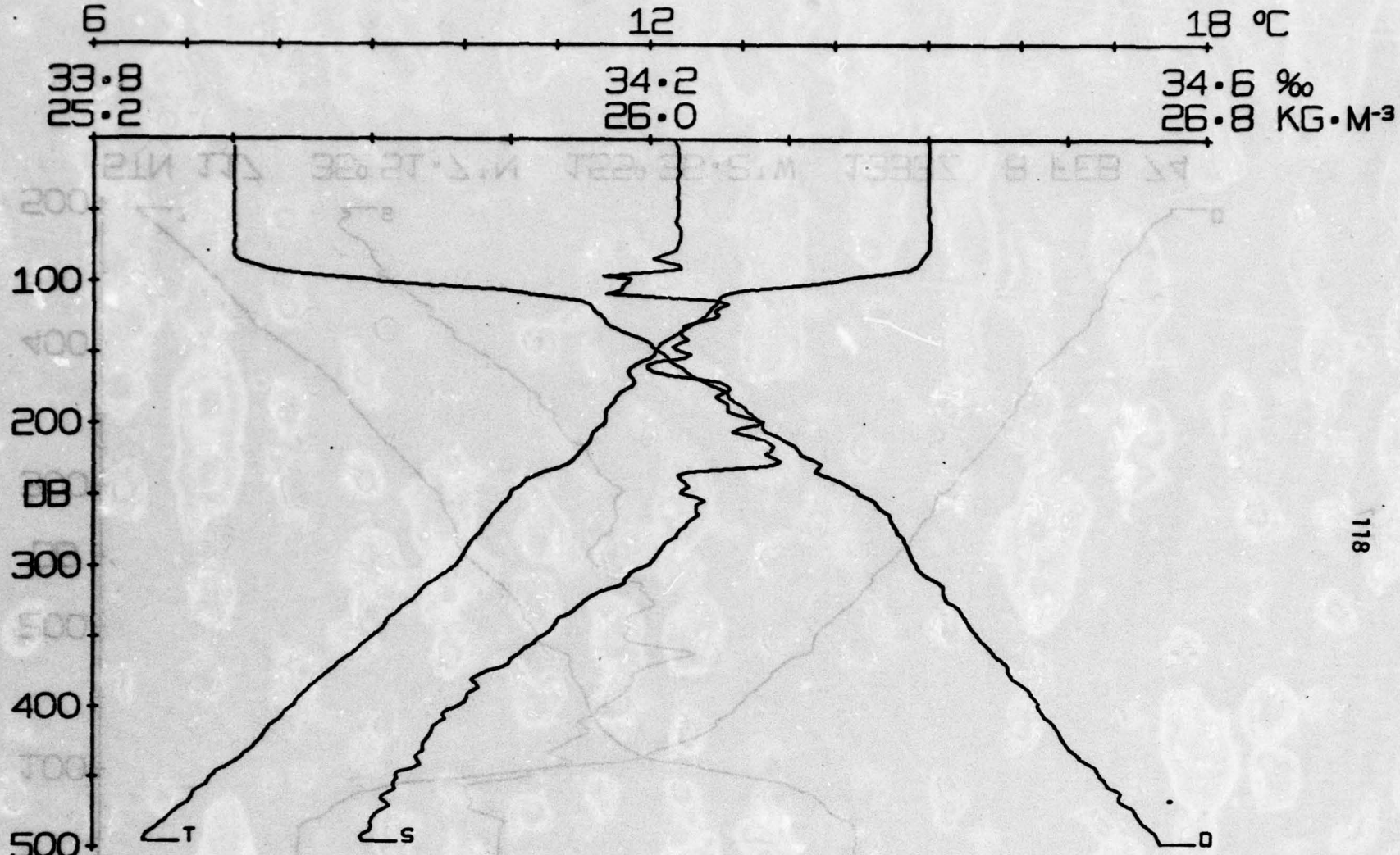
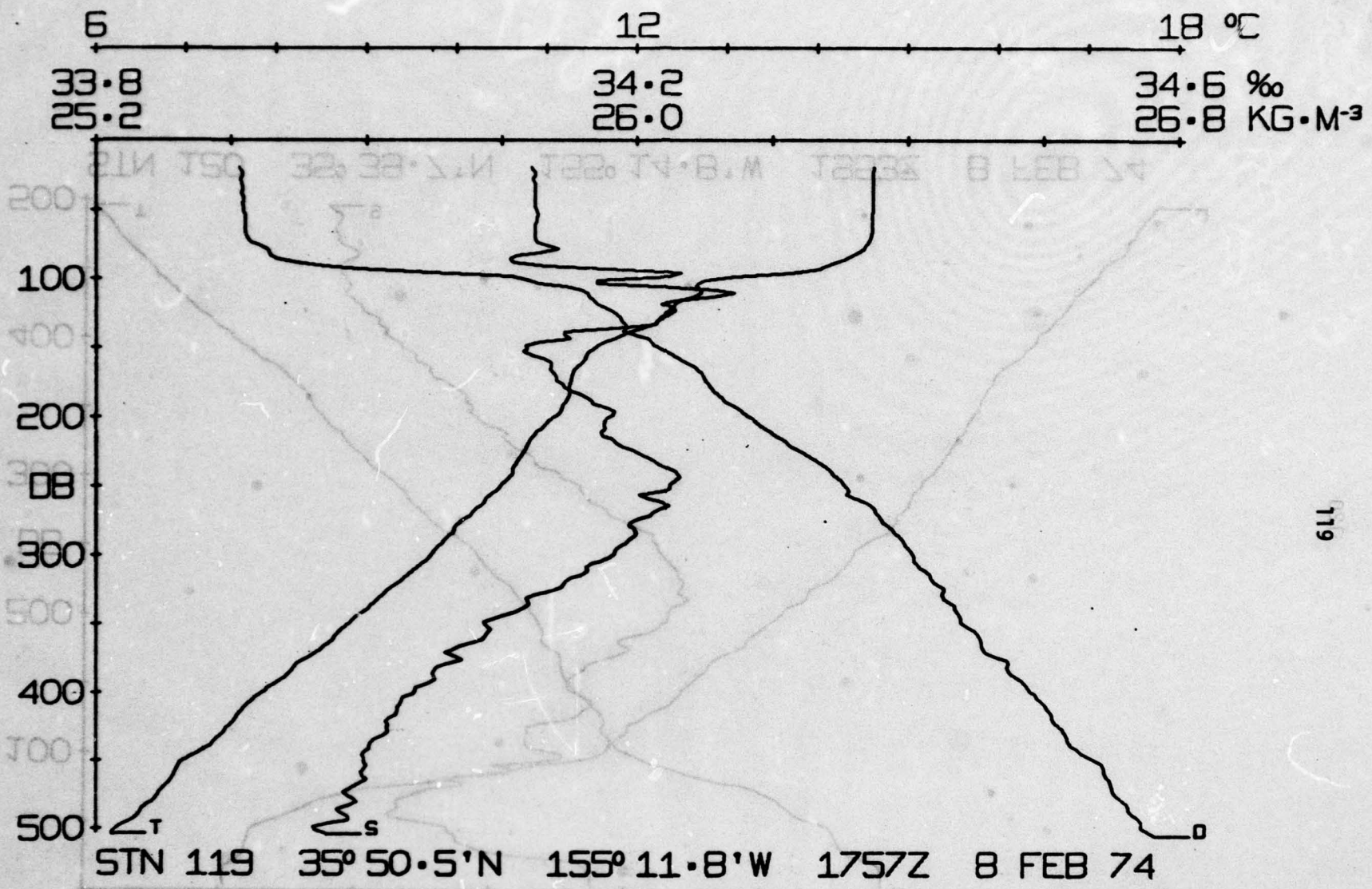
400
500
T
S
D
117
STN 117 35° 51·7'N 155° 36·2'W 1333Z 8 FEB 74



STN 118 36° 1·0'N 155° 13·6'W 1608Z 8 FEB 74

118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26·8 KG·M⁻³
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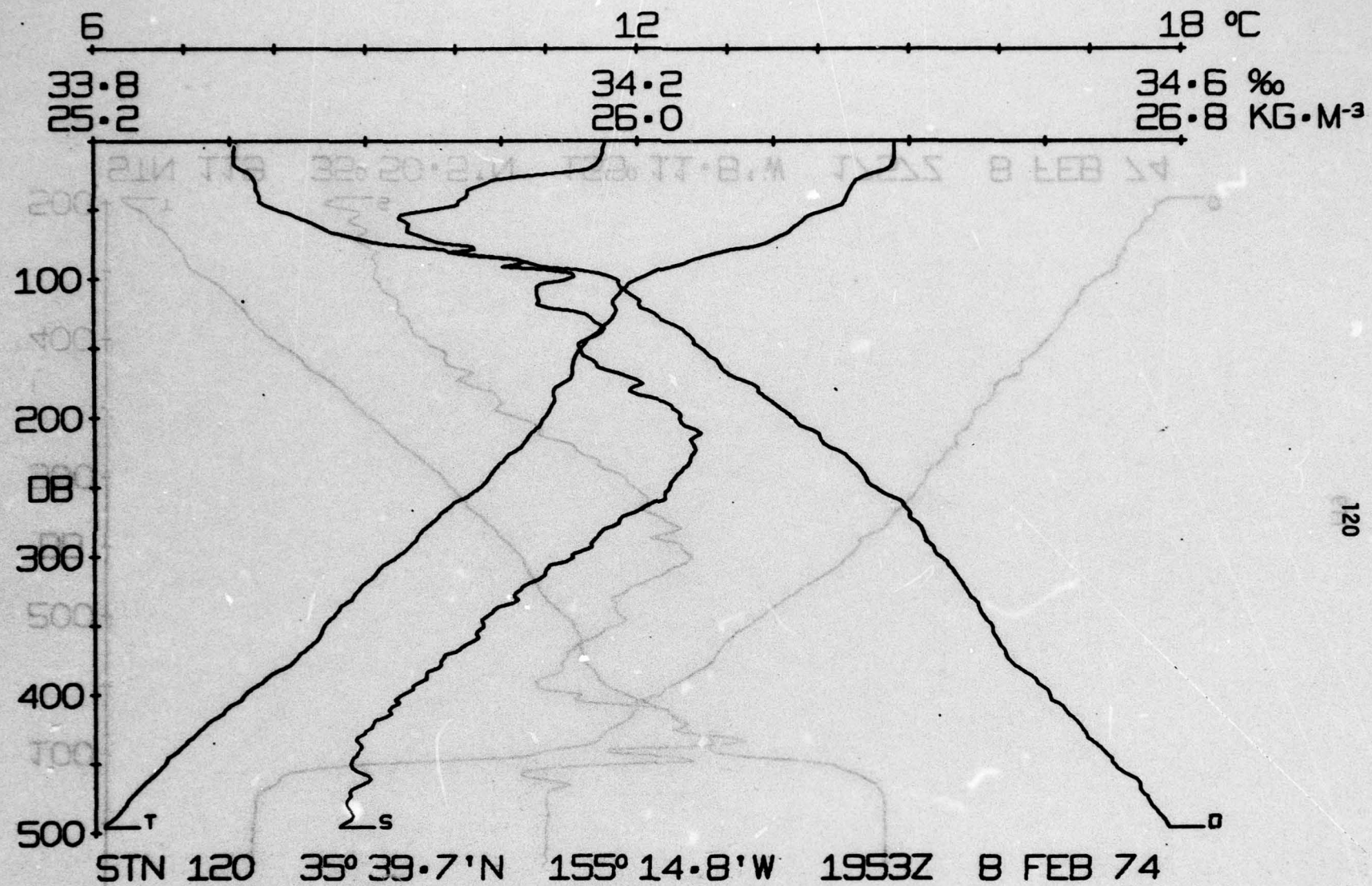
400
500
T
S
D
STN 119 35° 50·5'N 155° 11·8'W 1757Z 8 FEB 74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34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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T
S
O
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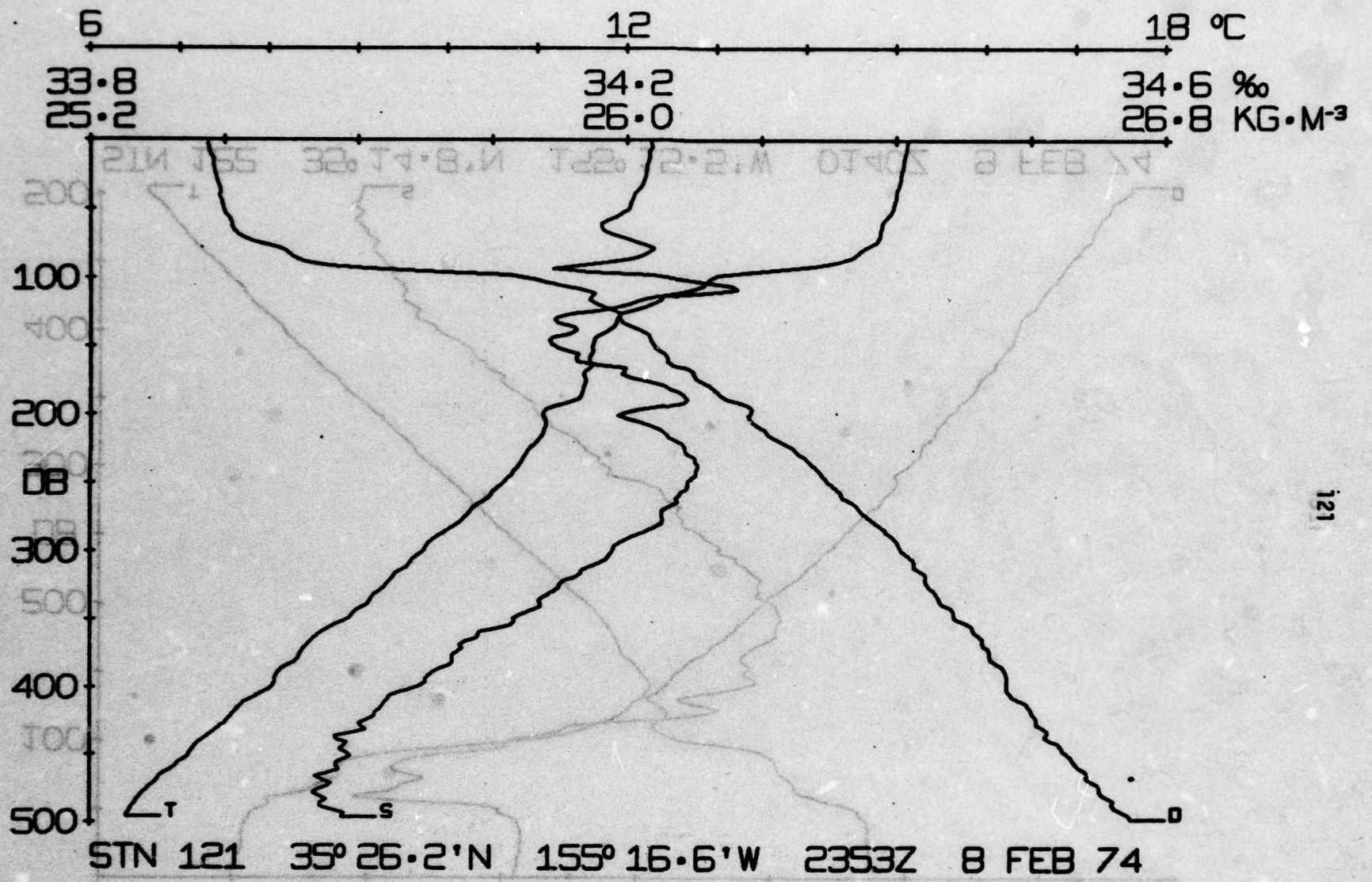
STN 120 35° 39·7'N 155° 14·8'W 1953Z 8 FEB 74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25·2
26·0
26·8 KG·M⁻³
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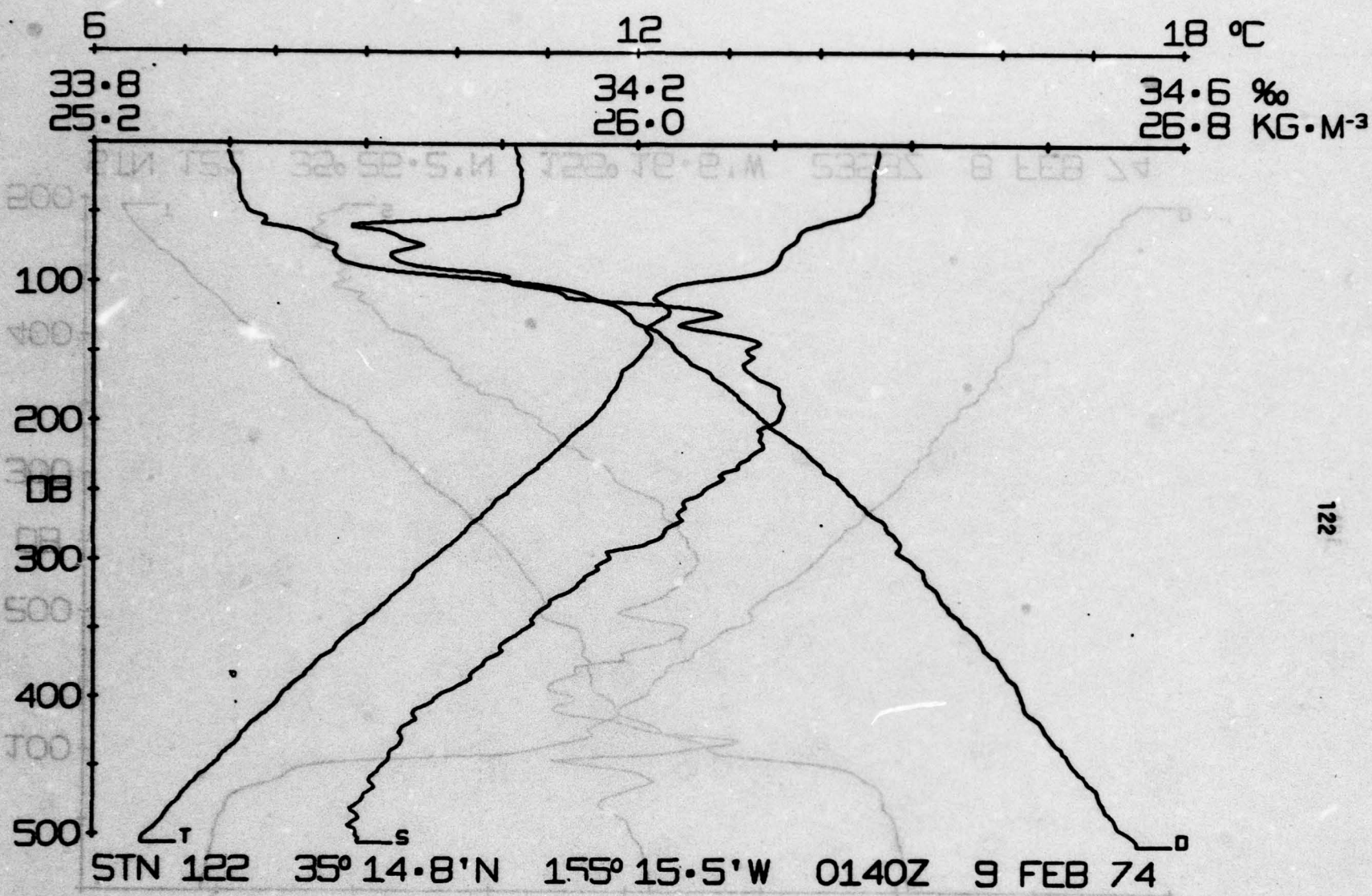
400
500
T
S
D
121
STN 121 35° 26·2'N 155° 16·6'W 2353Z 8 FEB 74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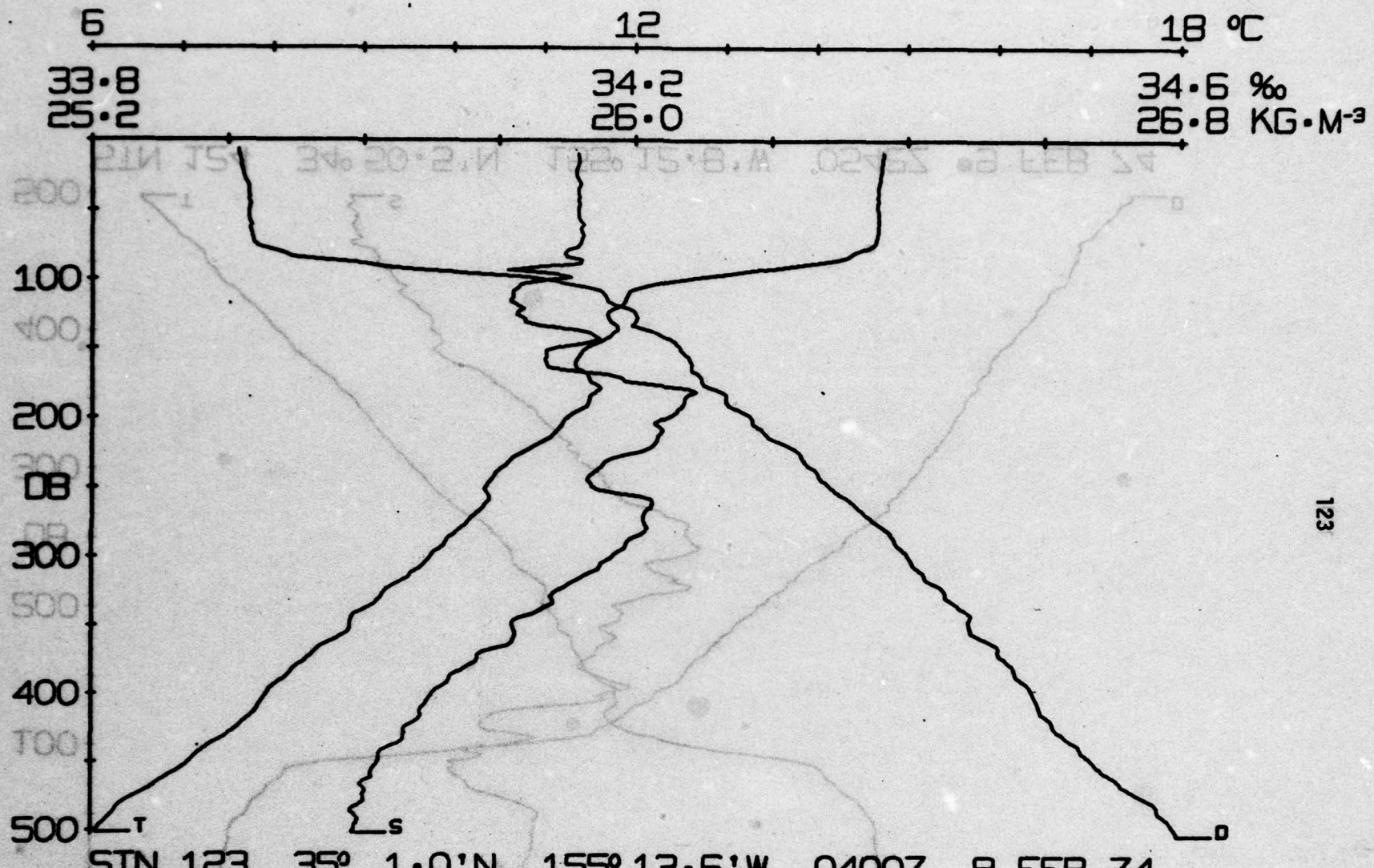
D
STN 122 35° 14·8'N 155° 15·5'W 0140Z 9 FEB 74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400
500
T
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D
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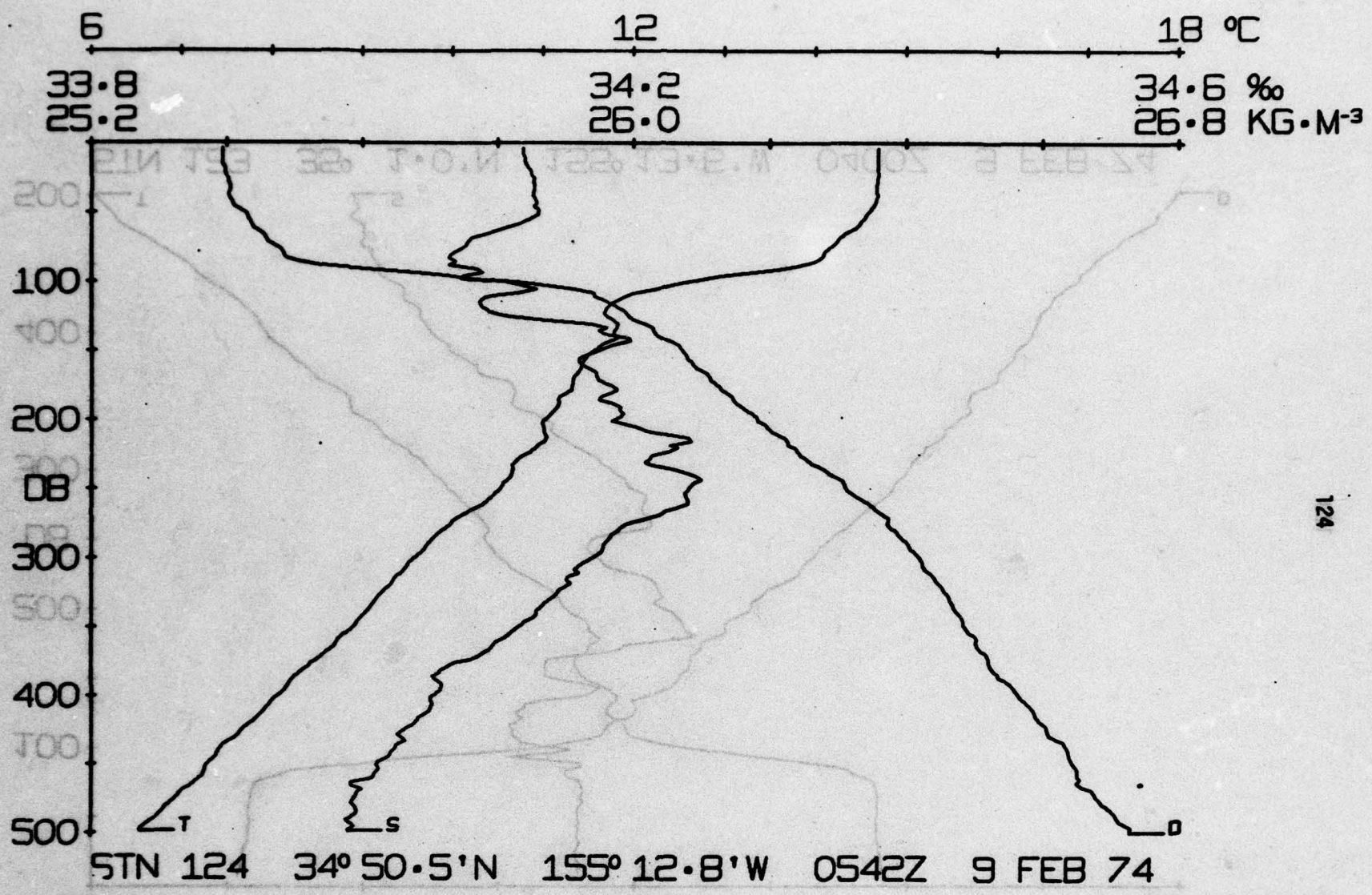
STN 123 35° 1·0'N 155° 13·6'W 0400Z 9 FEB 74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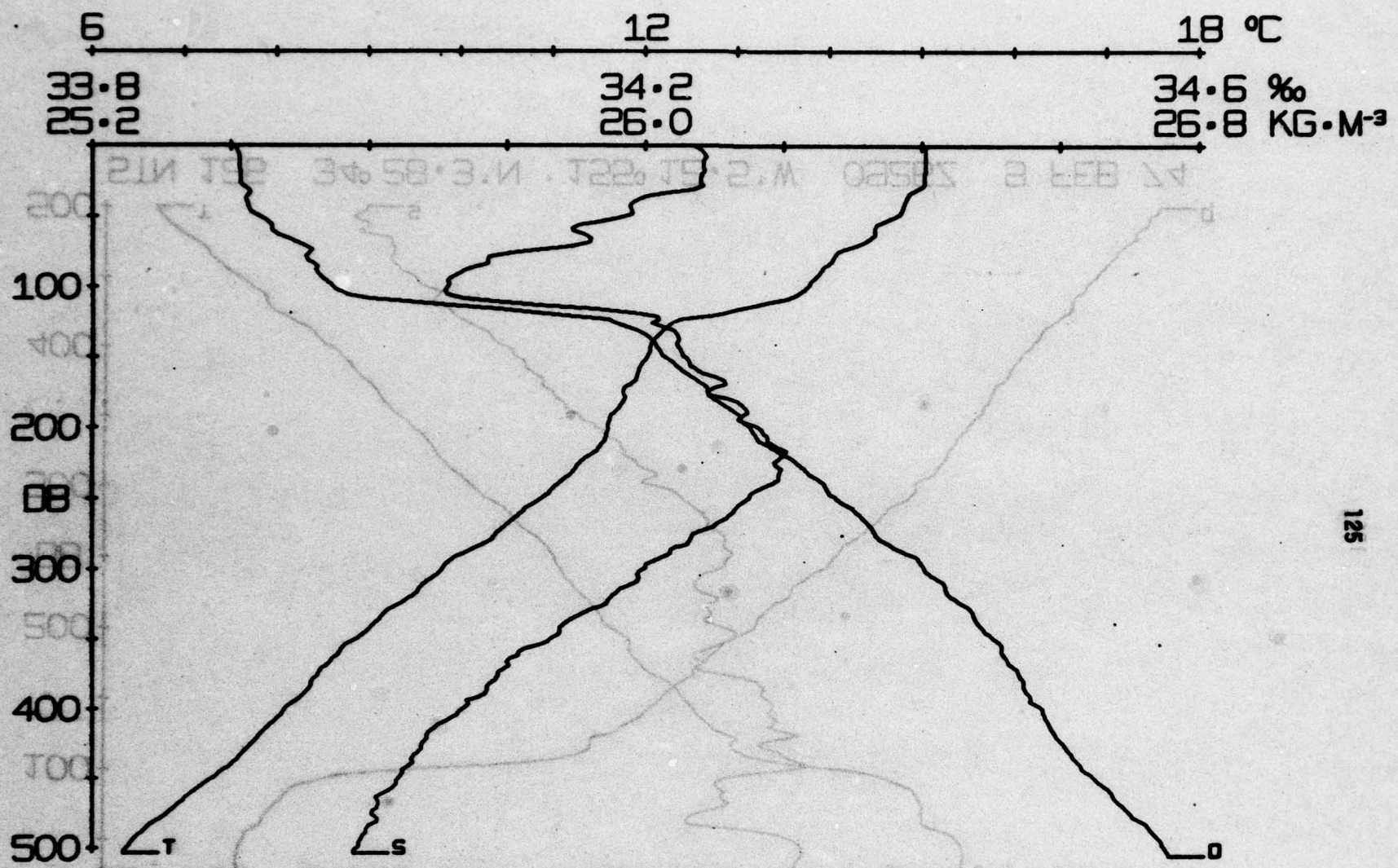
400
500
T
S
D
124
STN 124 34° 50·5'N 155° 12·8'W 0542Z 9 FEB 74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400
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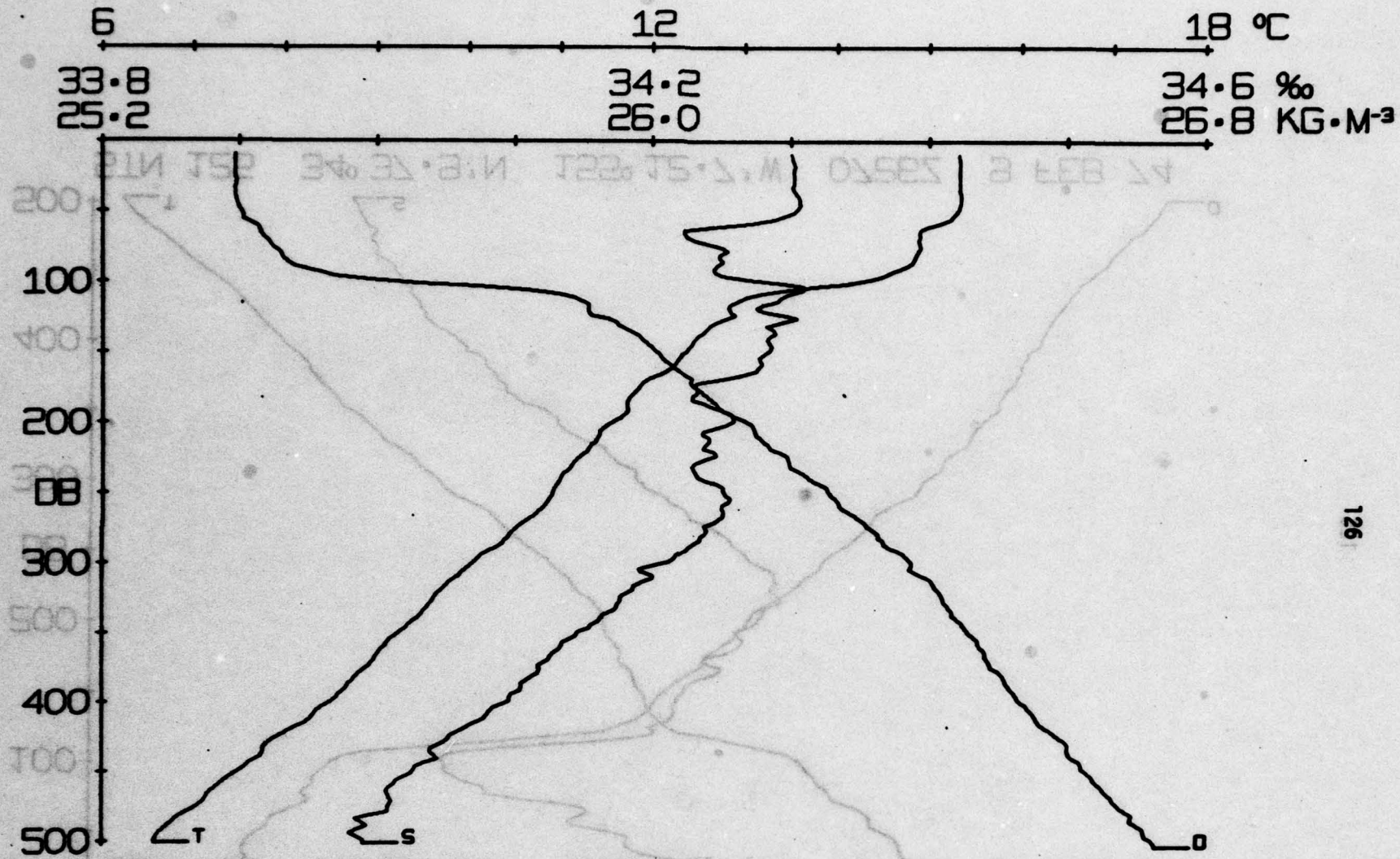
T
S
O
125
STN 125 34° 37·9'N 155° 12·7'W 0726Z 9 FEB 74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25·2
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26·8 KG·M⁻³
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400
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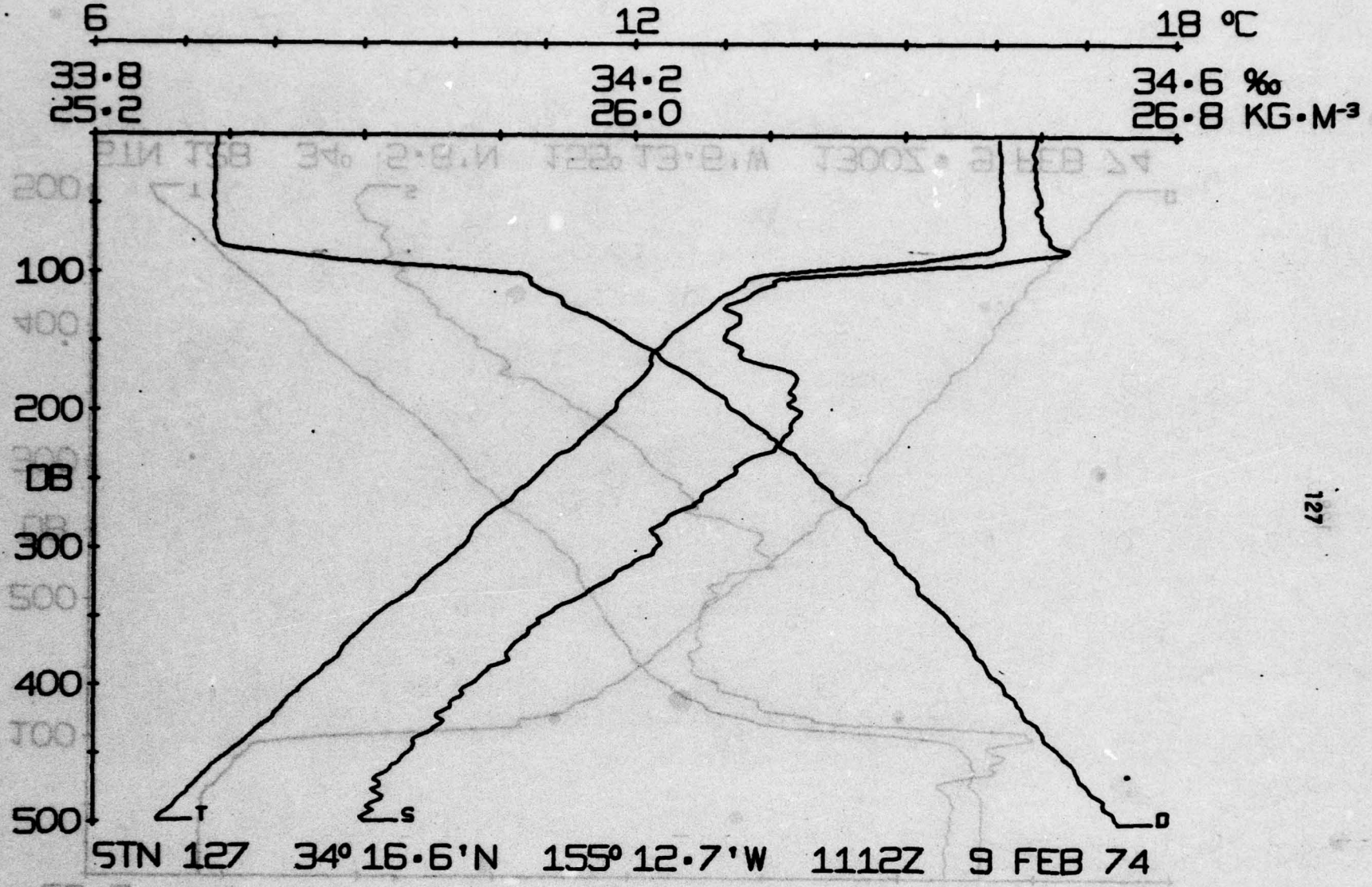
T
S
O
STN 126 34° 28·3'N 155° 12·5'W 0926Z 9 FEB 74

126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T
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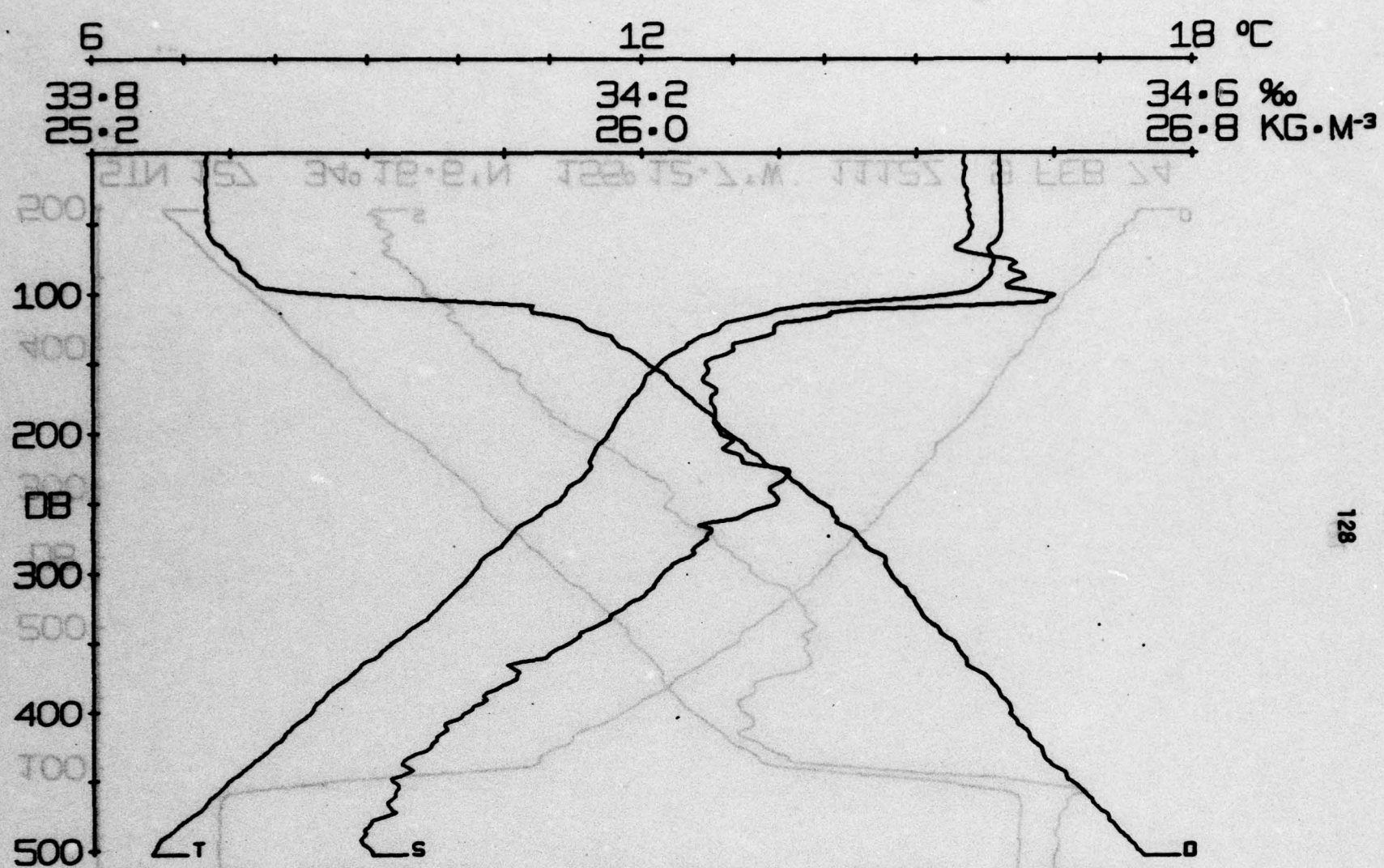
D
STN 127 34° 16·6'N 155° 12·7'W 1112Z 9 FEB 74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33·8
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26·0
26·8 KG·M⁻³
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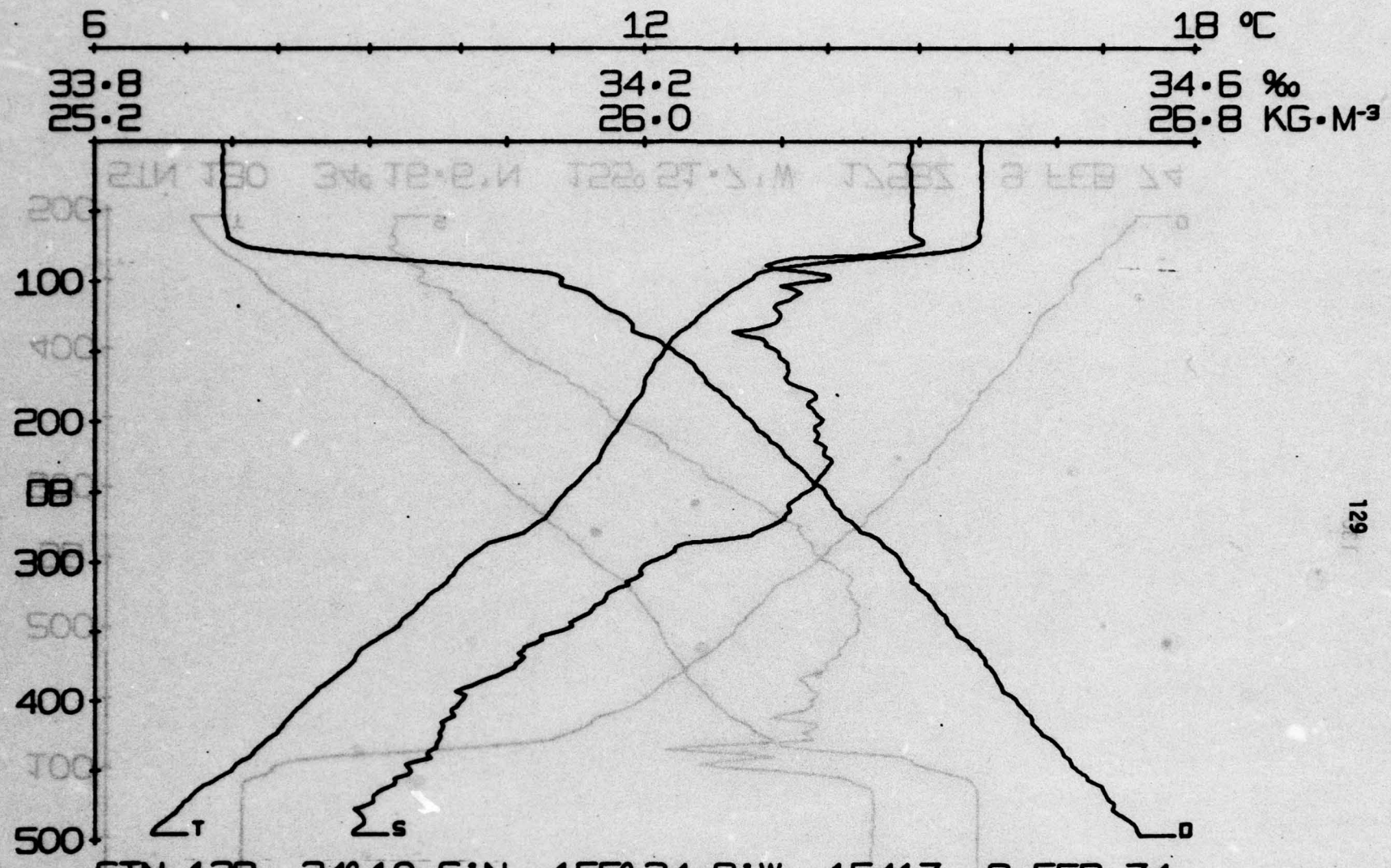
300
400
500
T
S
D
128
STN 128 34° 5·8'N 155° 13·6'W 1300Z 9 FEB 74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25·2
26·0
26·8 KG·M⁻³
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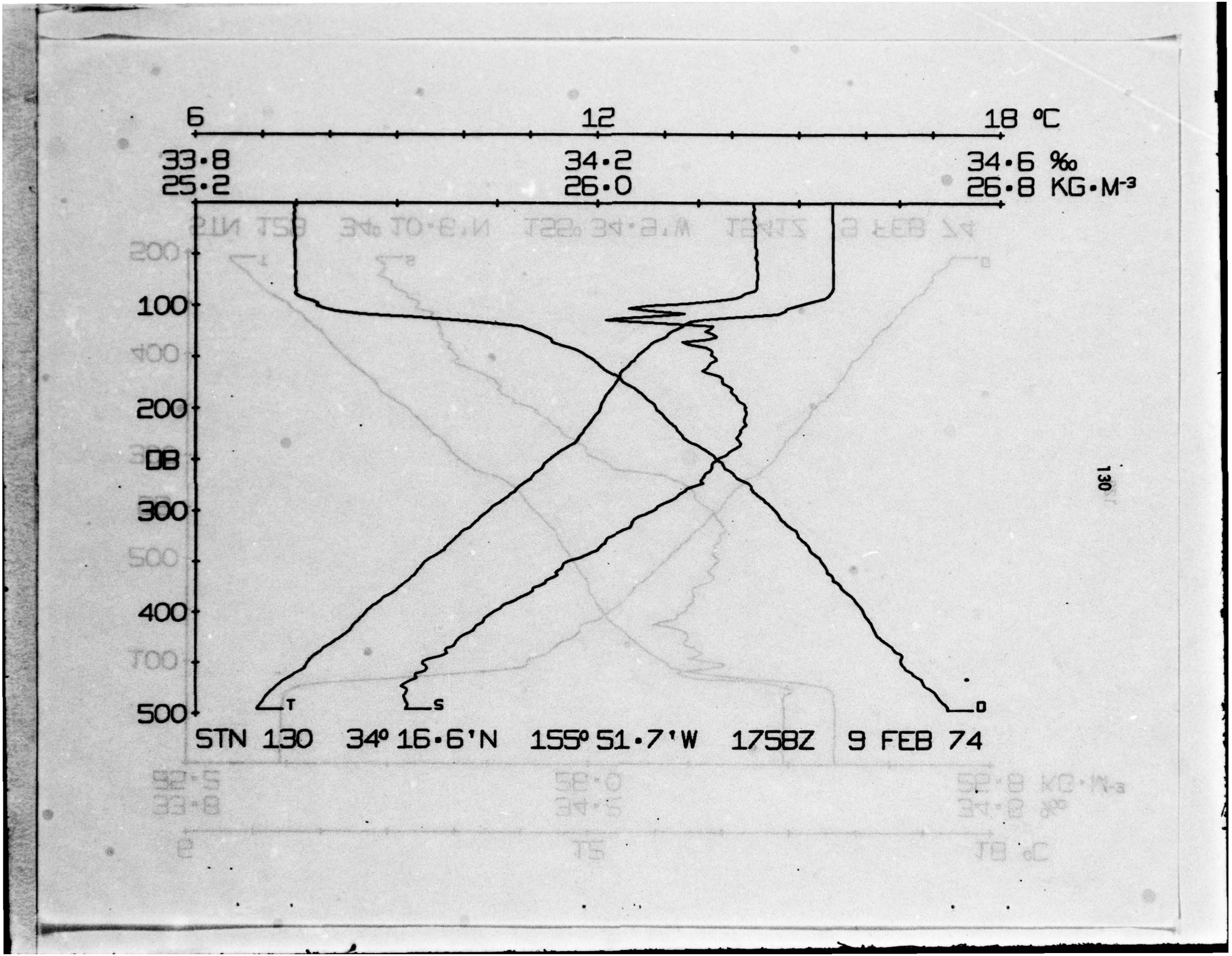
400
500
T
S
D
STN 129 34° 10·6'N 155° 34·9'W 1541Z 9 FEB 74

129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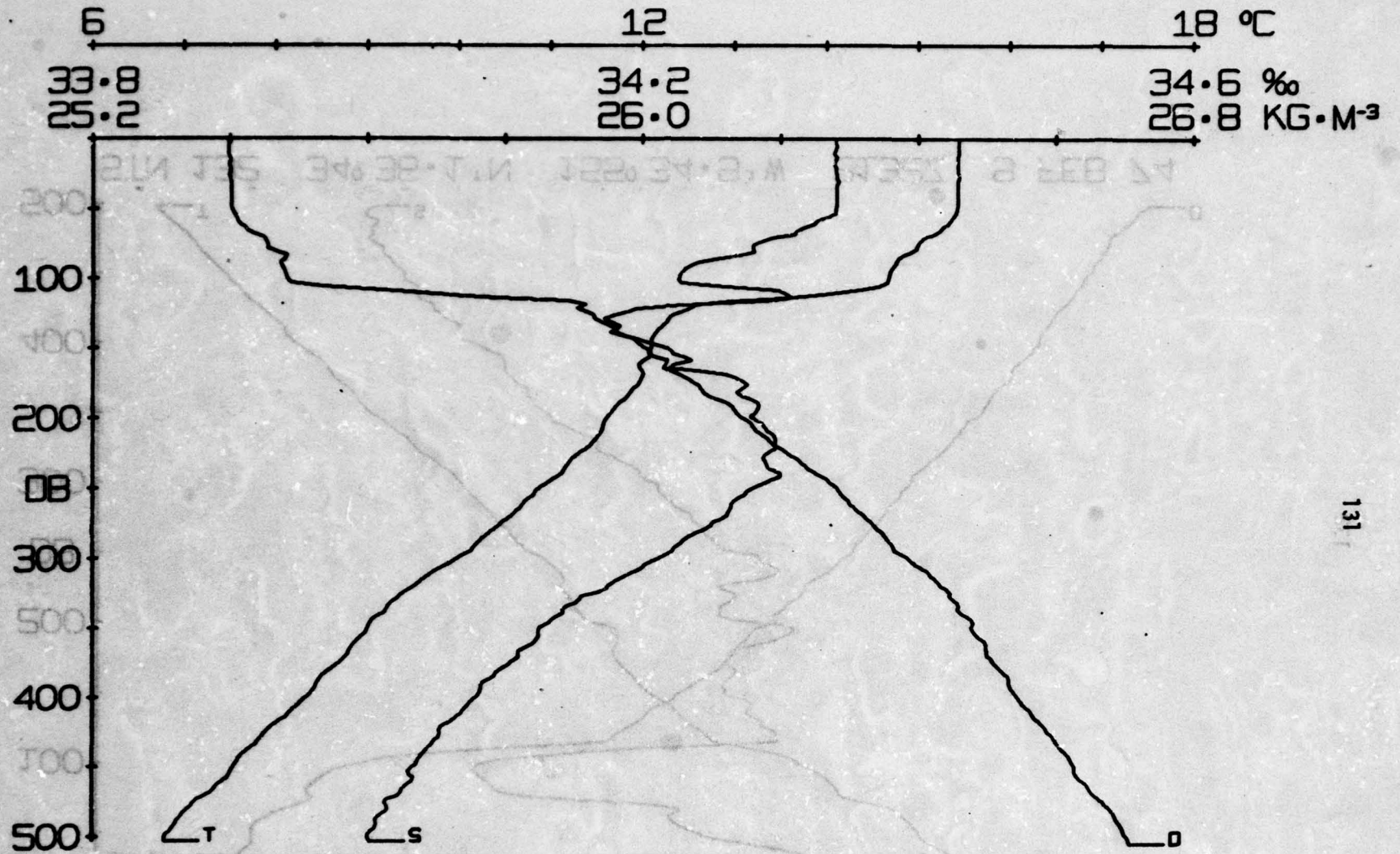
400
500
T
S
D
STN 130 34° 16·6'N 155° 51·7'W 1758Z 9 FEB 74
130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26·0
26·8 KG·M⁻³
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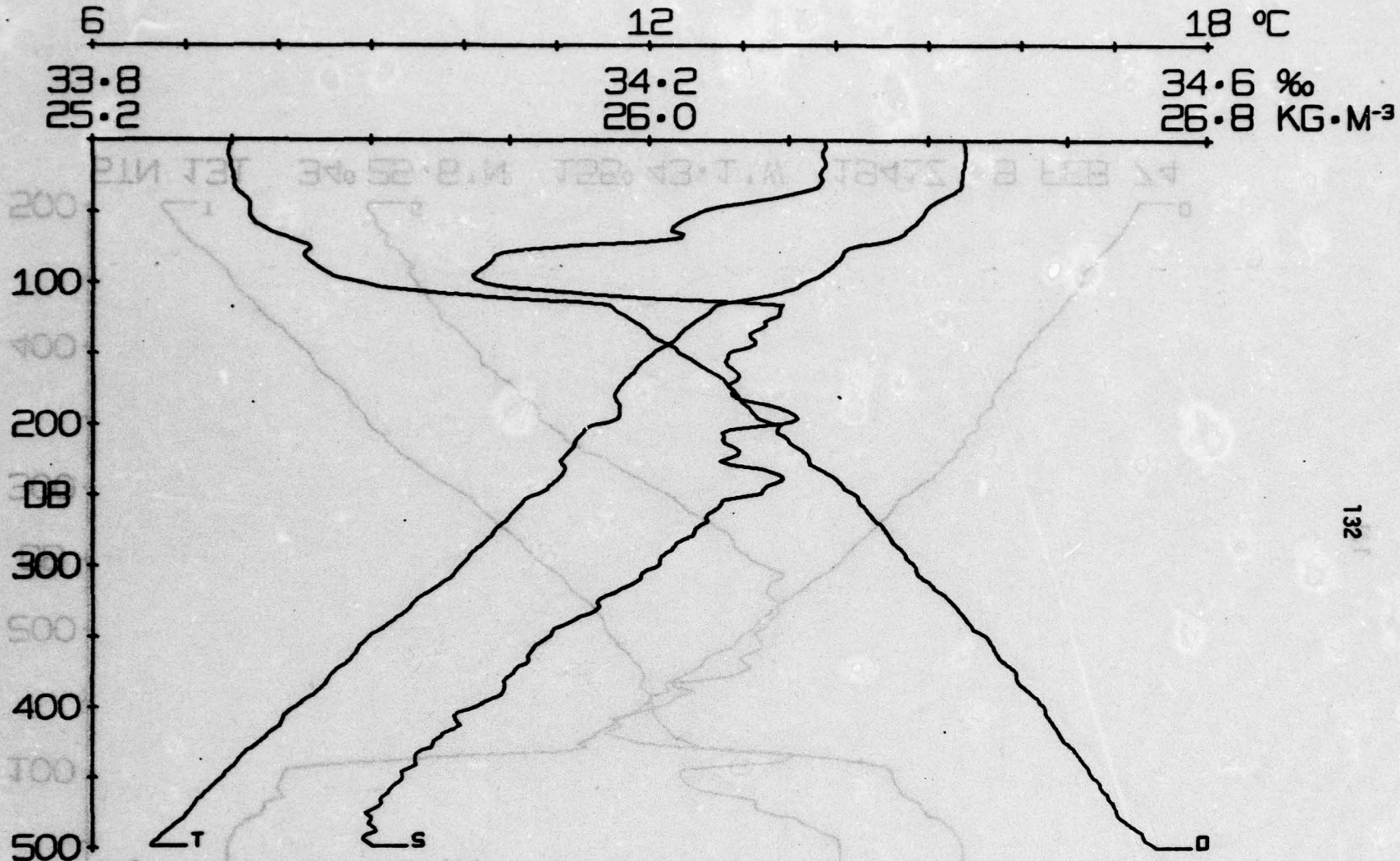
300
400
500
T
S
D
STN 131 34° 26·6'N 155° 43·1'W 1941Z 9 FEB 74

131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26·8 KG·M⁻³
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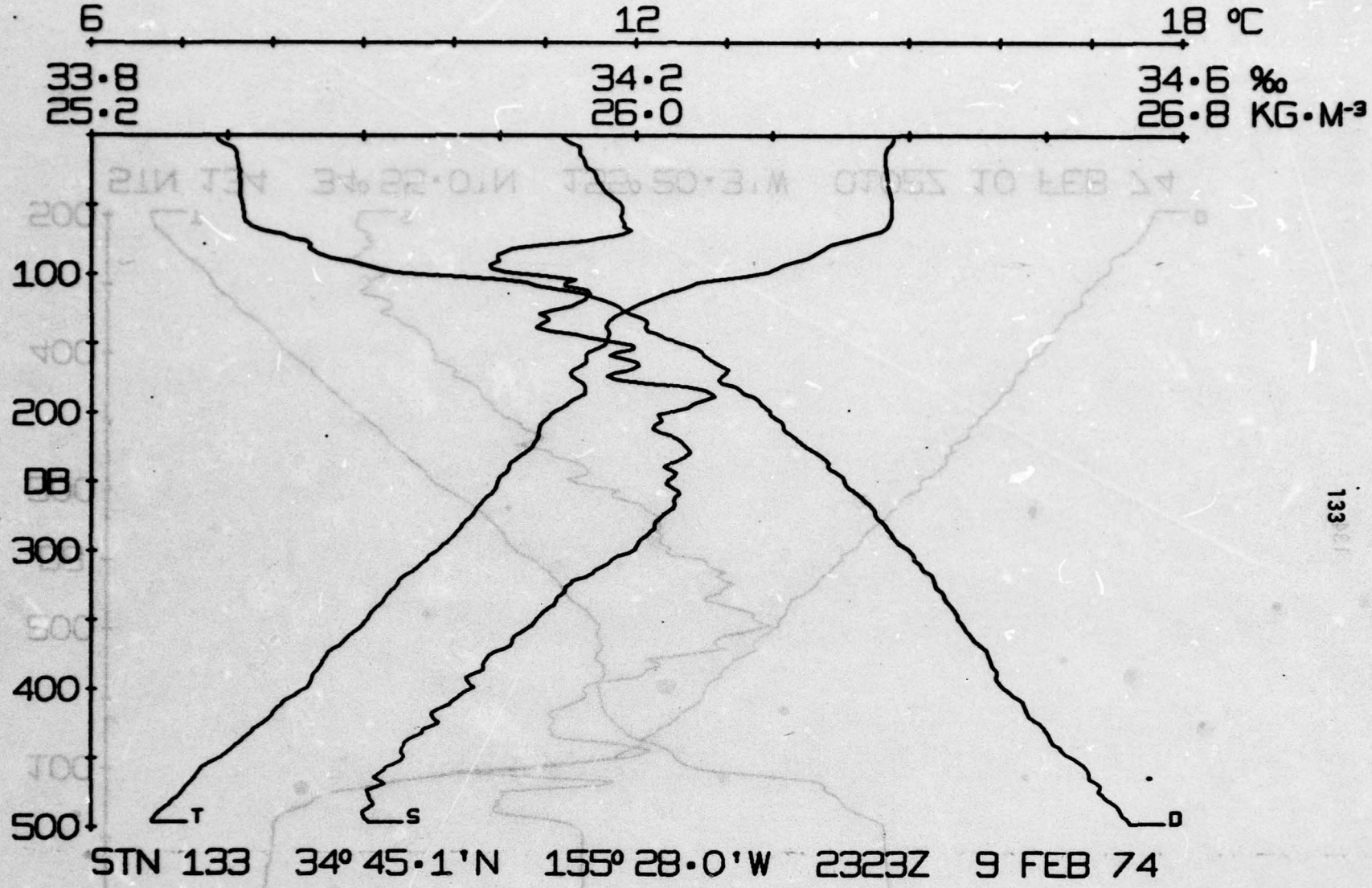
DB
300
400
500
T
S
D
132
STN 132 34° 36·1'N 155° 34·9'W 2132Z 9 FEB 74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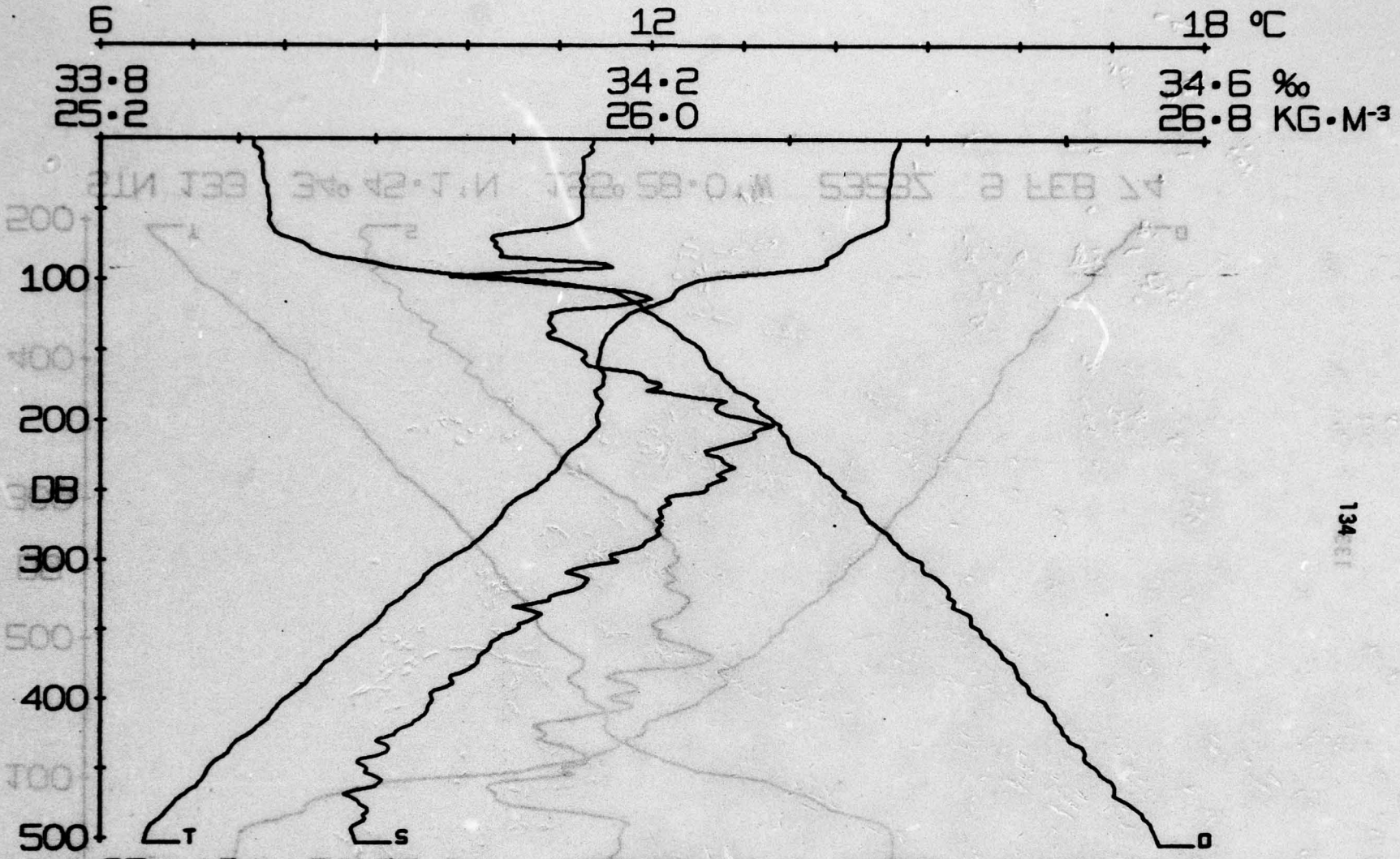
D
STN 133 34° 45·1'N 155° 28·0'W 2323Z 9 FEB 74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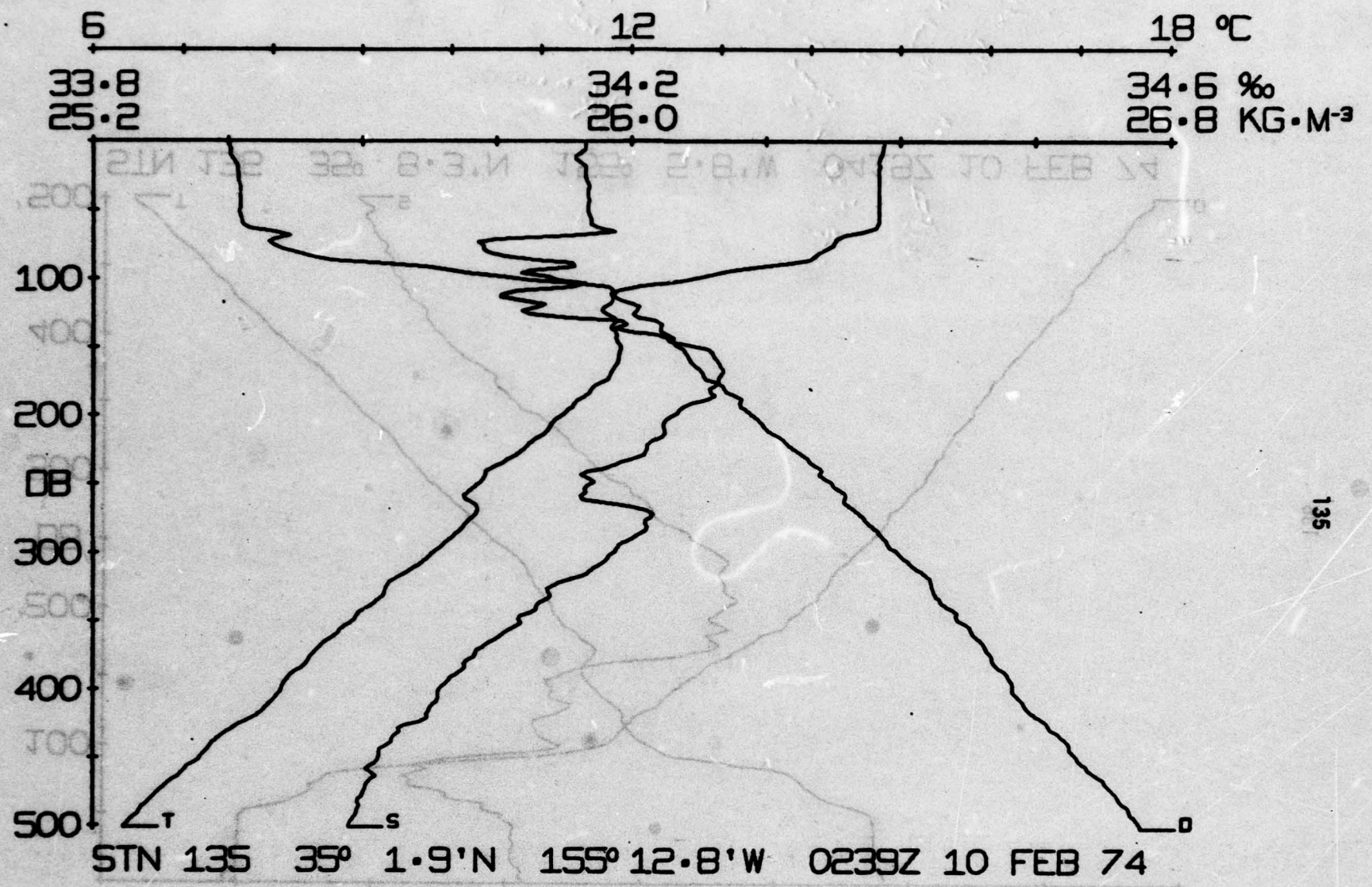
500
T
S
D
STN 134 34° 55·0'N 155° 20·3'W 0102Z 10 FEB 74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34·6 ‰
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26·0
26·8 KG·M⁻³
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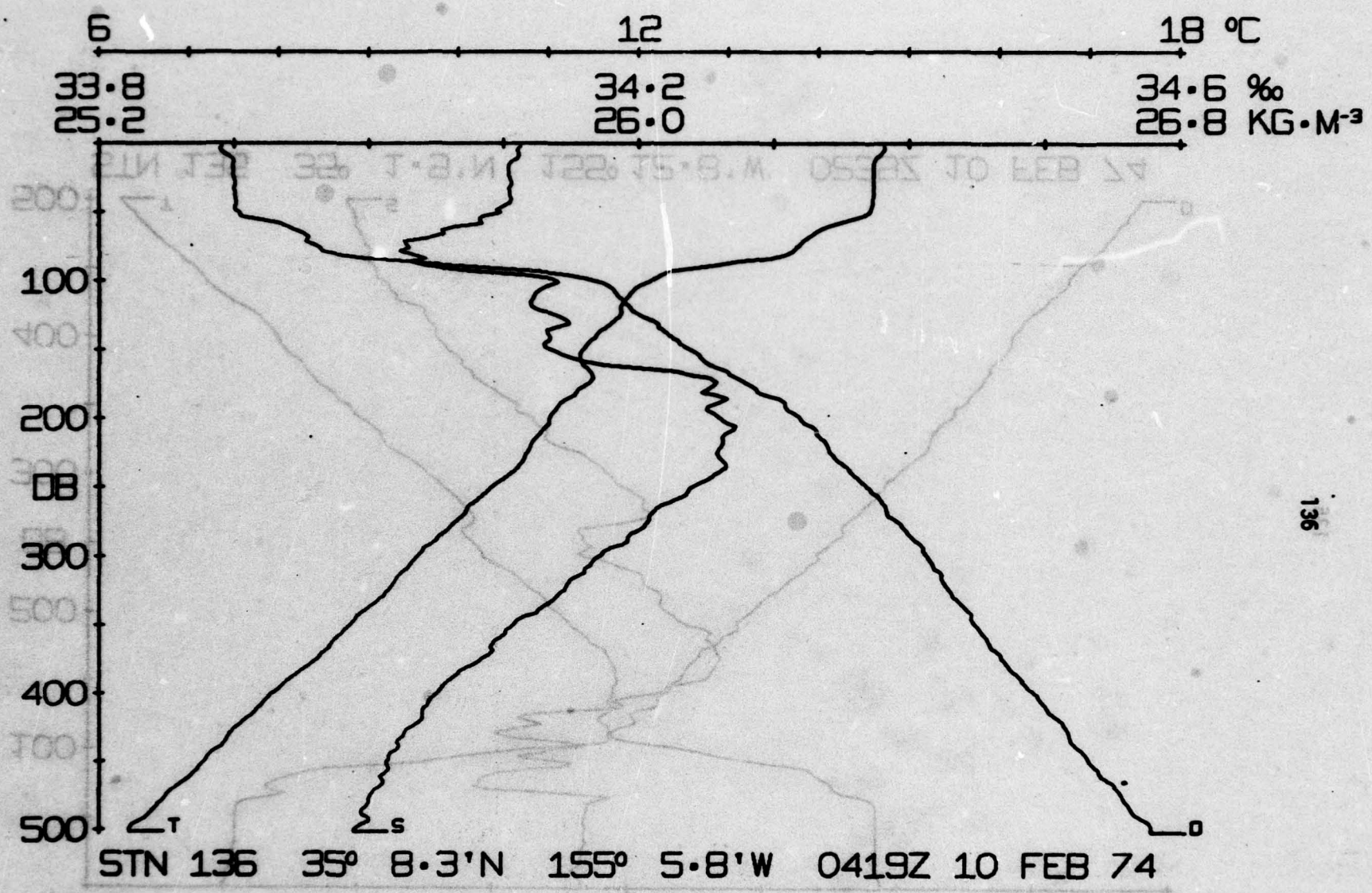
DB
300
400
500
T
S
D
135
STN 135 35° 1·9'N 155° 12·8'W 0239Z 10 FEB 74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18 °C
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34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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DB
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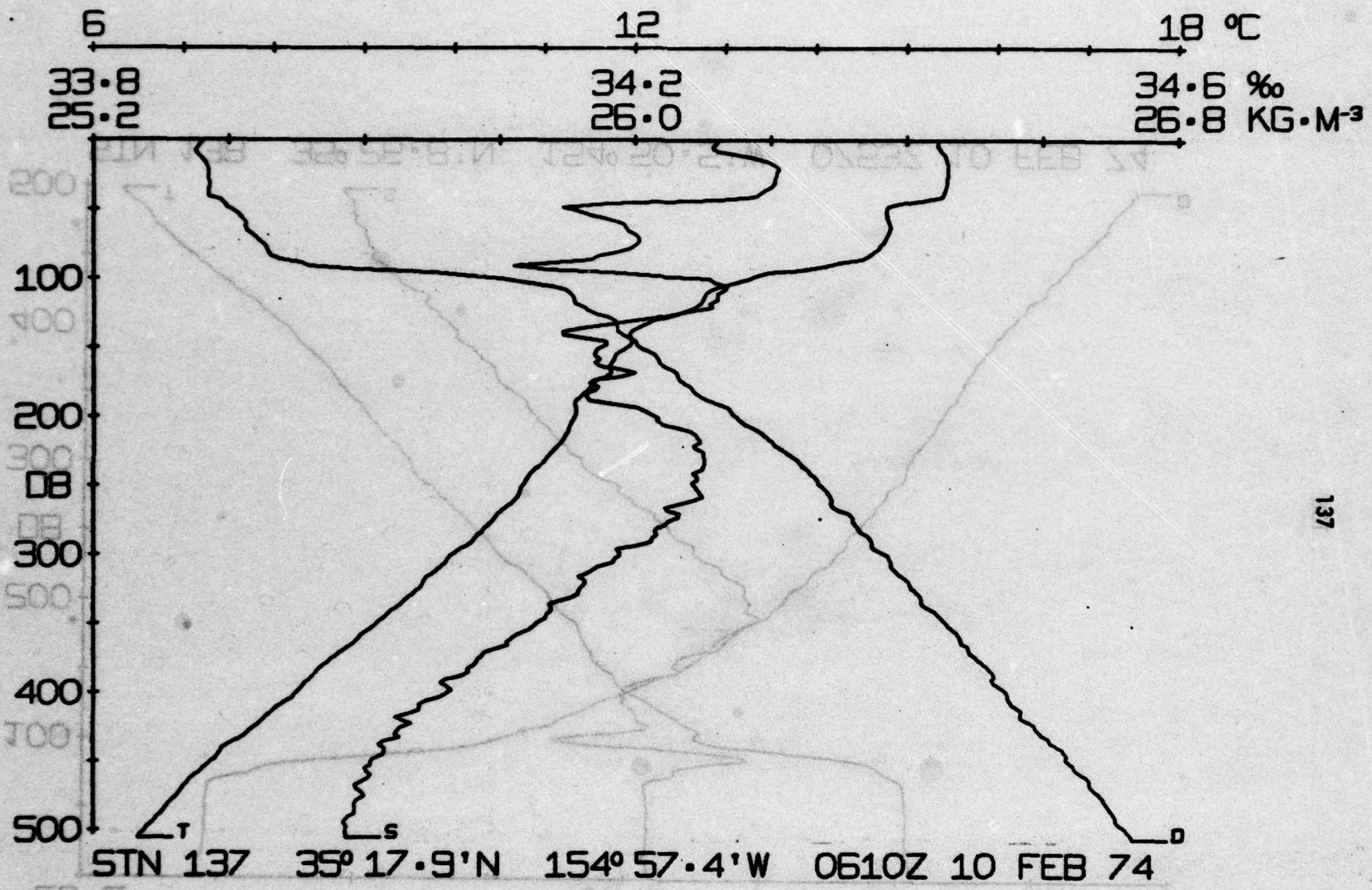
400
500
T
S
D
136
STN 136 35° 8·3'N 155° 5·8'W 0419Z 10 FEB 74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18 °C
33·8
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34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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DB
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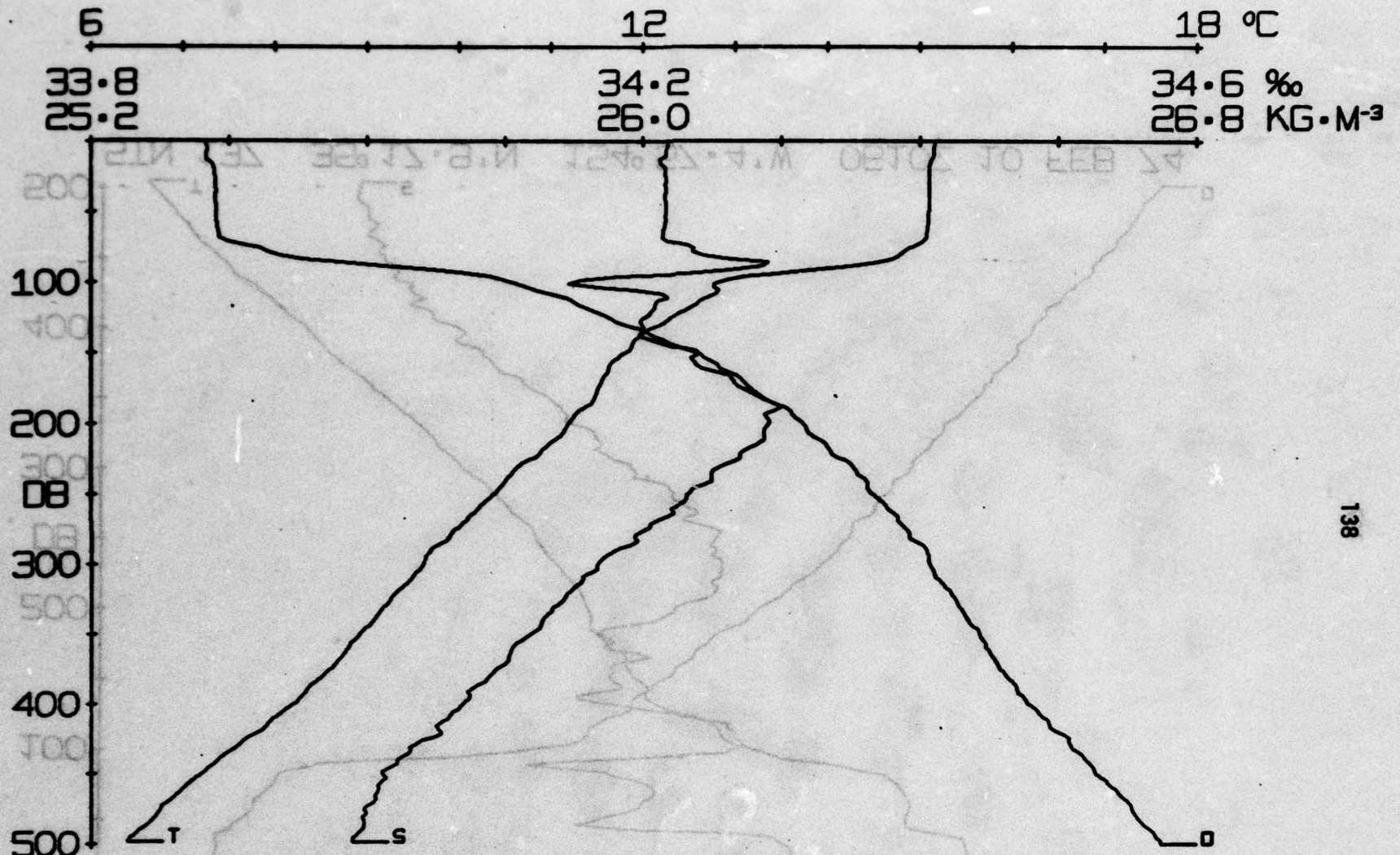
400
500
T
S
D
STN 137 35° 17·9'N 154° 57·4'W 0610Z 10 FEB 74

137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18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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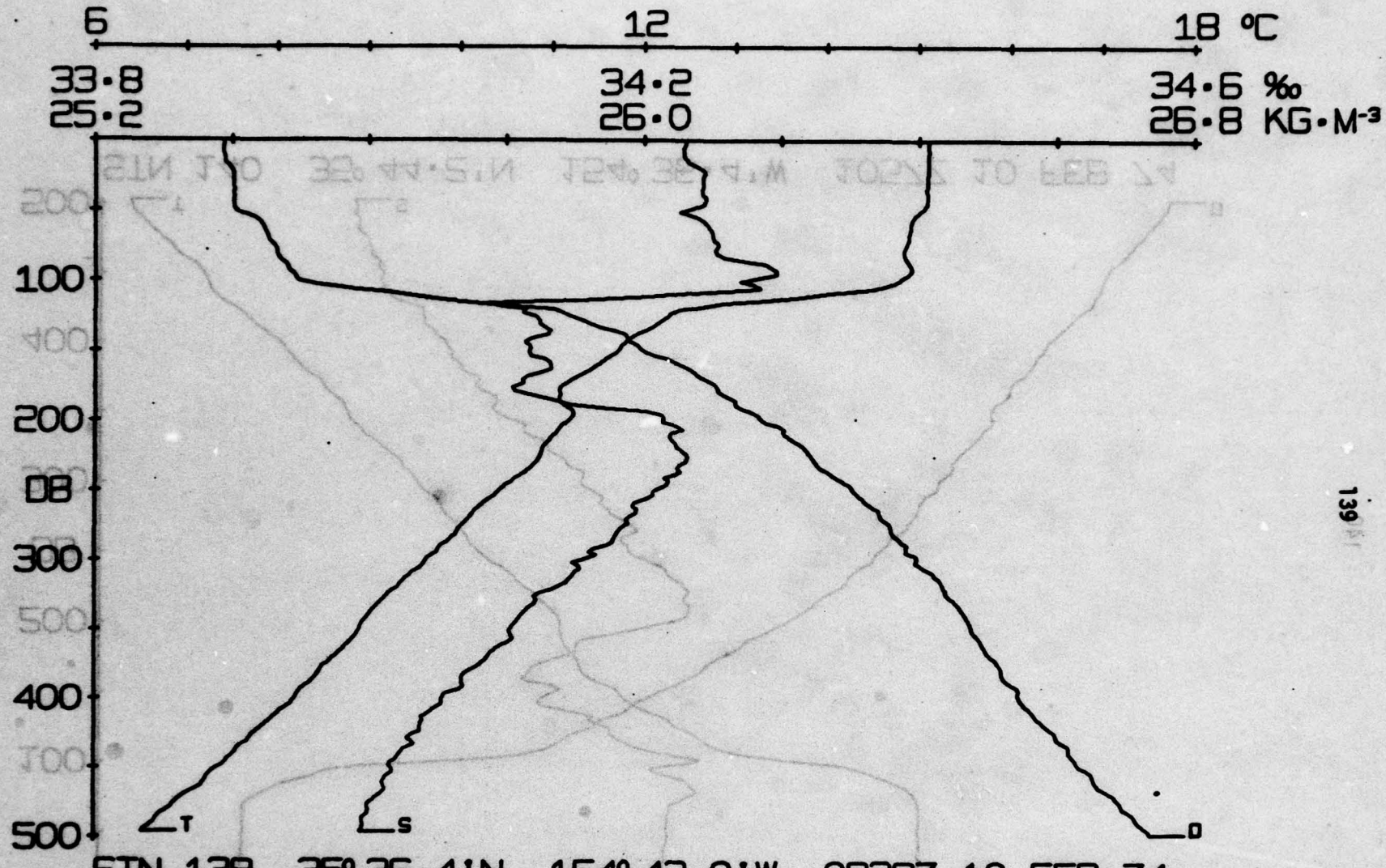
DB
300
400
500
T
S
D
138
STN 138 35° 26·8'N 154° 50·5'W 0753Z 10 FEB 74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25·2
26·0
26·8 KG·M⁻³
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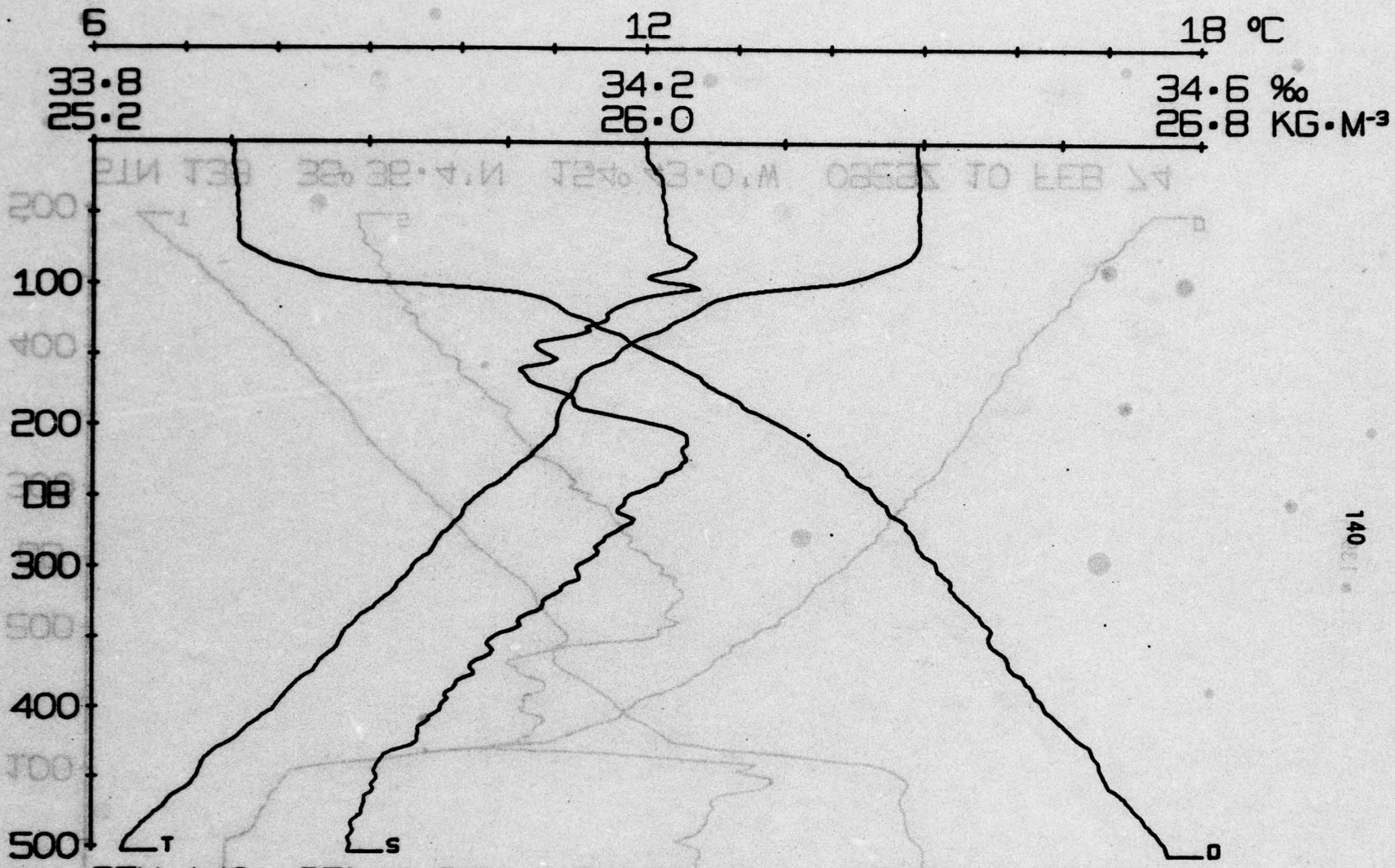
200
DB
300
400
500
T
S
D
STN 139 35° 36·4'N 154° 43·0'W 0929Z 10 FEB 74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34·2
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34·6 ‰
26·8 KG·M⁻³
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DB
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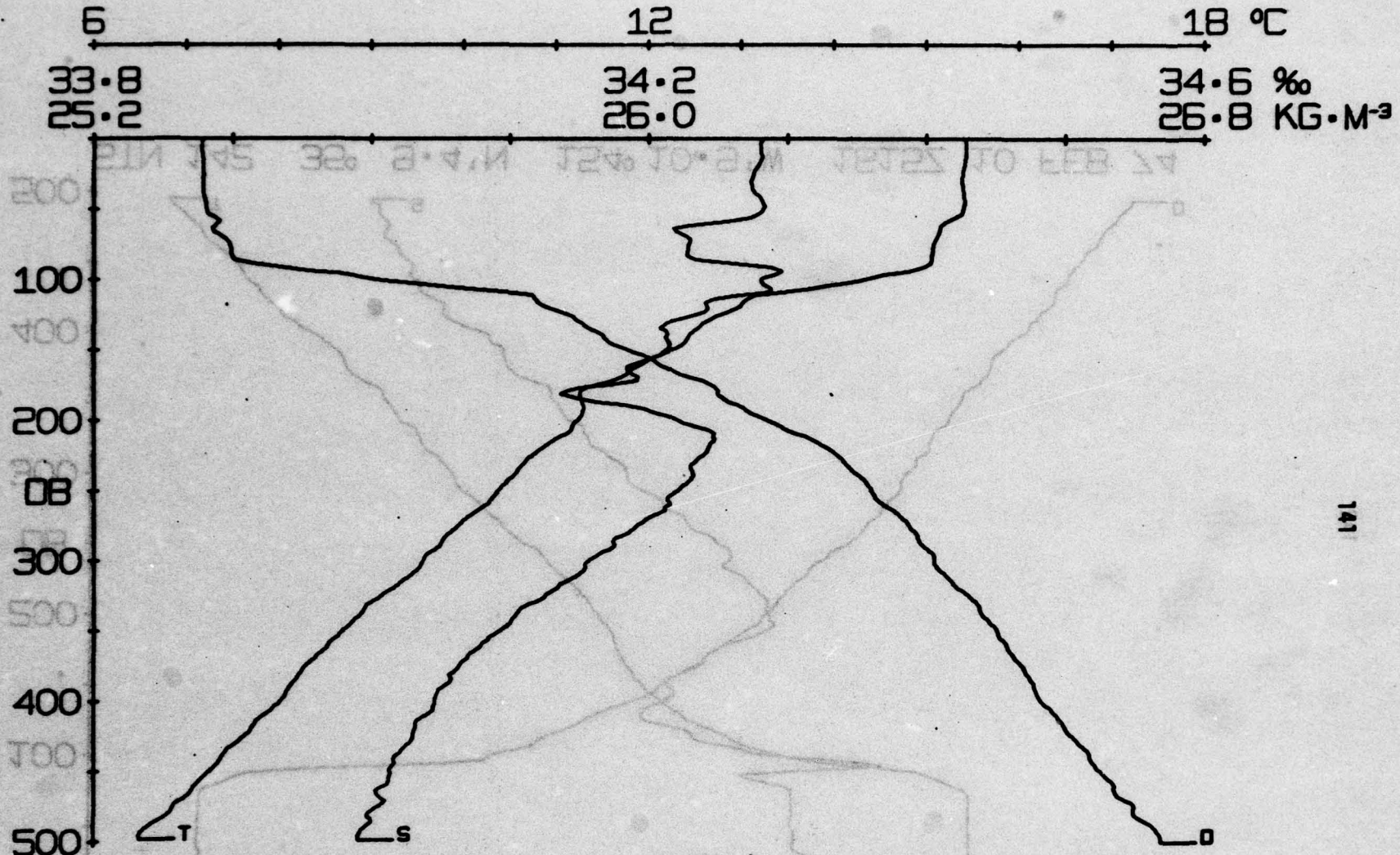
400
500
T
S
D
140
STN 140 35° 44·2'N 154° 36·4'W 1057Z 10 FEB 74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25·2
26·0
26·8 KG·M⁻³
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DB
300
400
500
T
S
D
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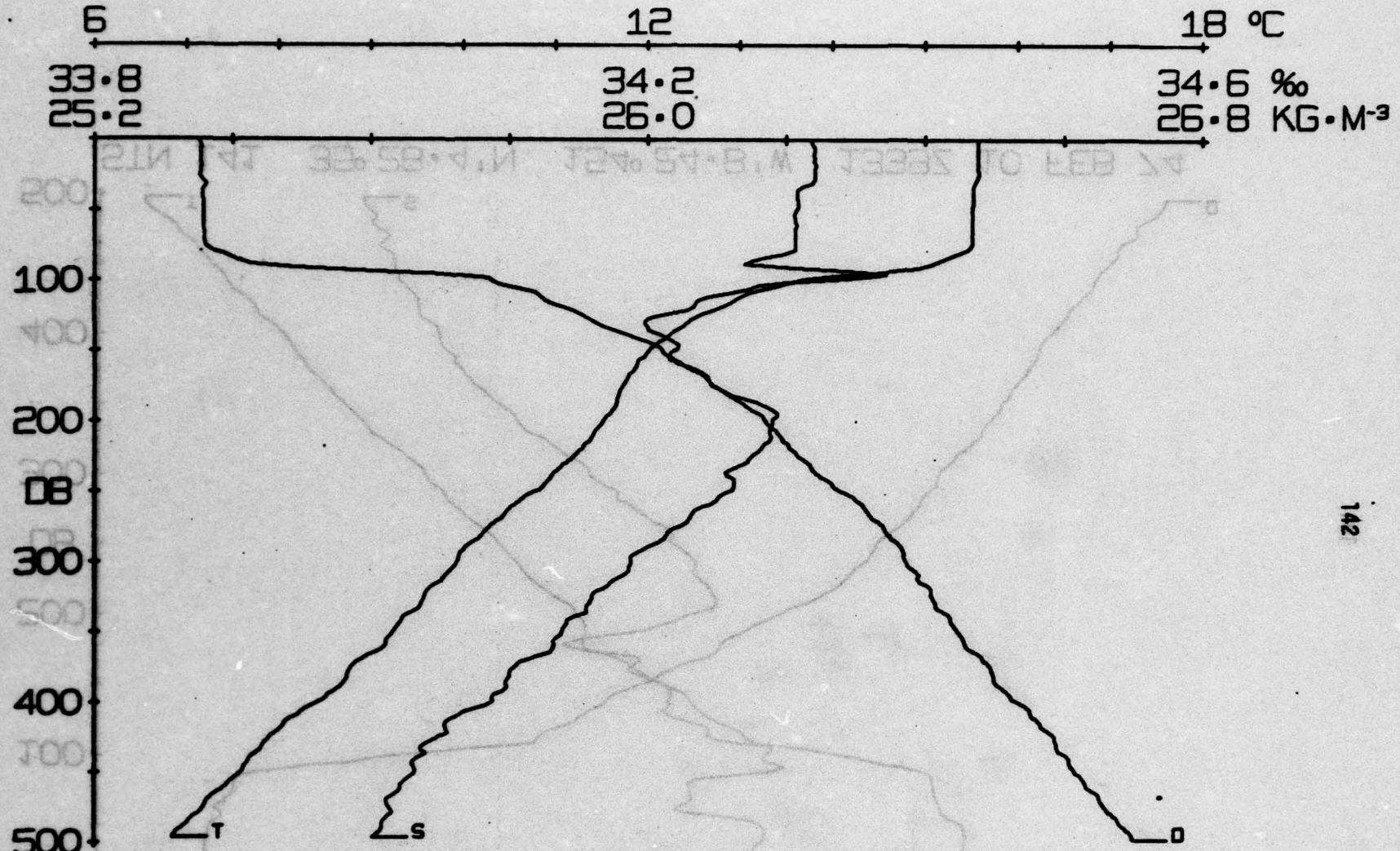
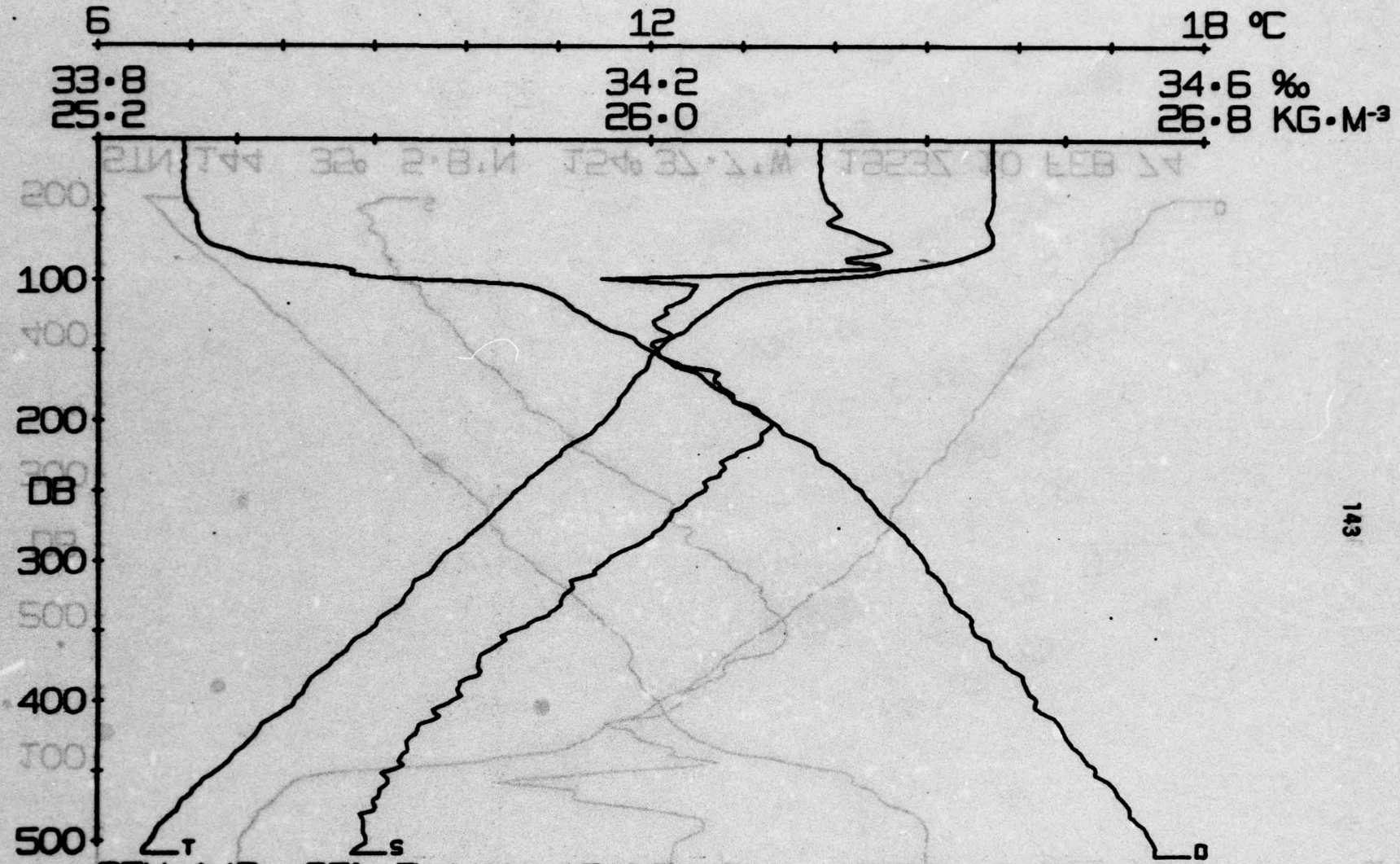


STN 142 35° 9·4'N 154° 10·9'W 1615Z 10 FEB 74

142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34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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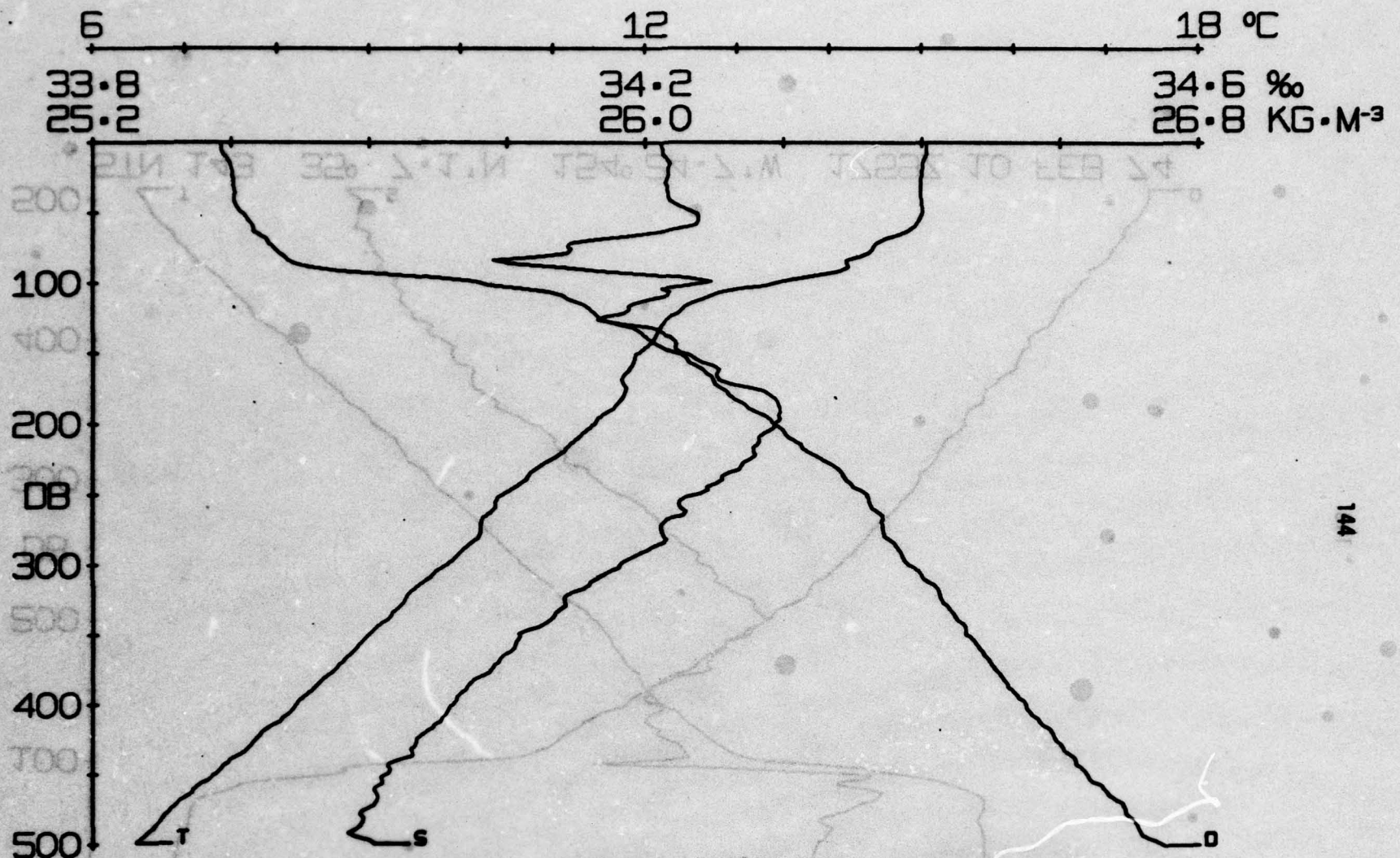
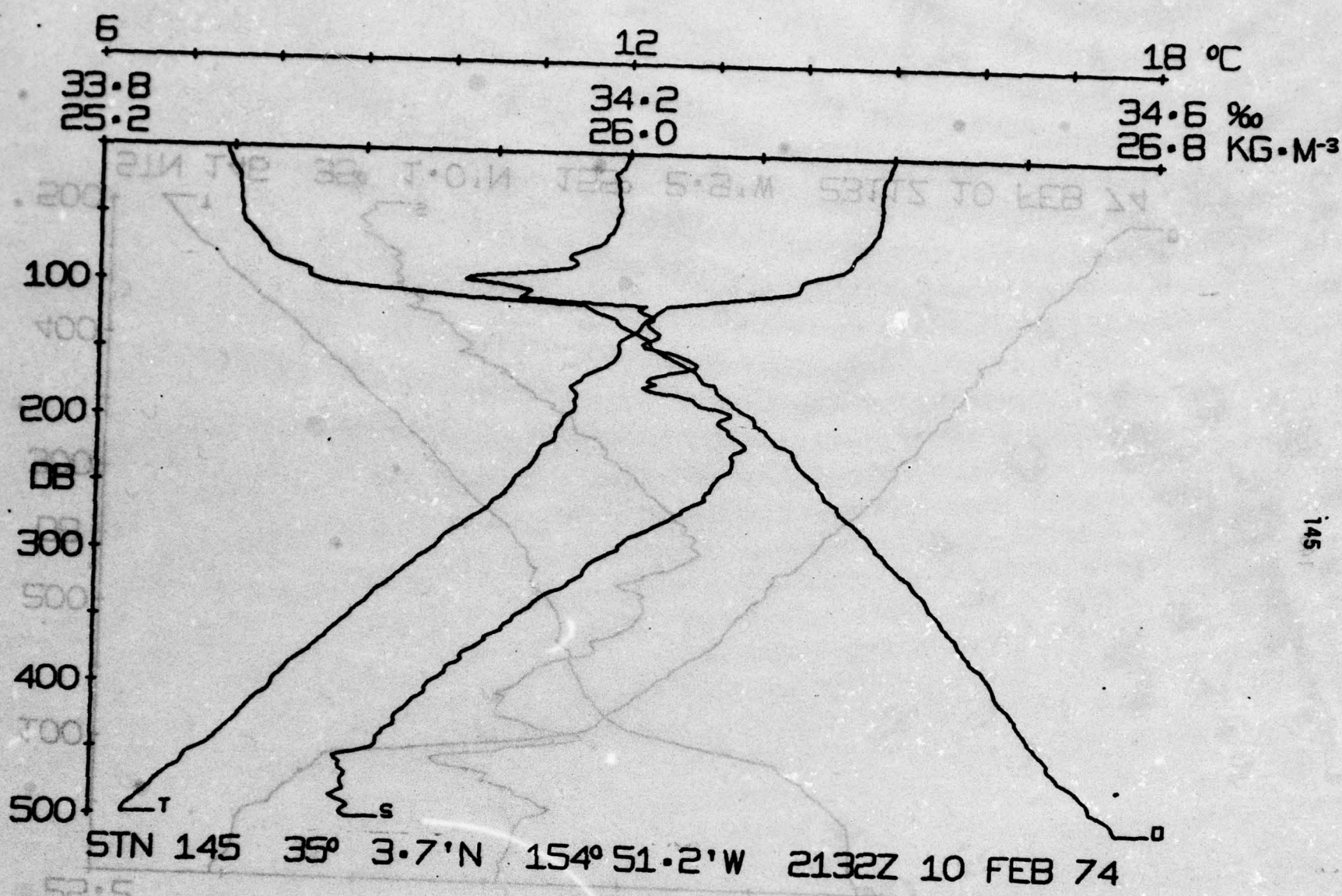
400
500
T
S
D
STN 143 35° 7·1'N 154° 24·7'W 1759Z 10 FEB 74

143



STN 144 35° 5·8'N 154° 37·7'W 1953Z 10 FEB 74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18 °C
33·8
25·2
34·2
26·0
34·6 ‰
26·8 KG·M⁻³
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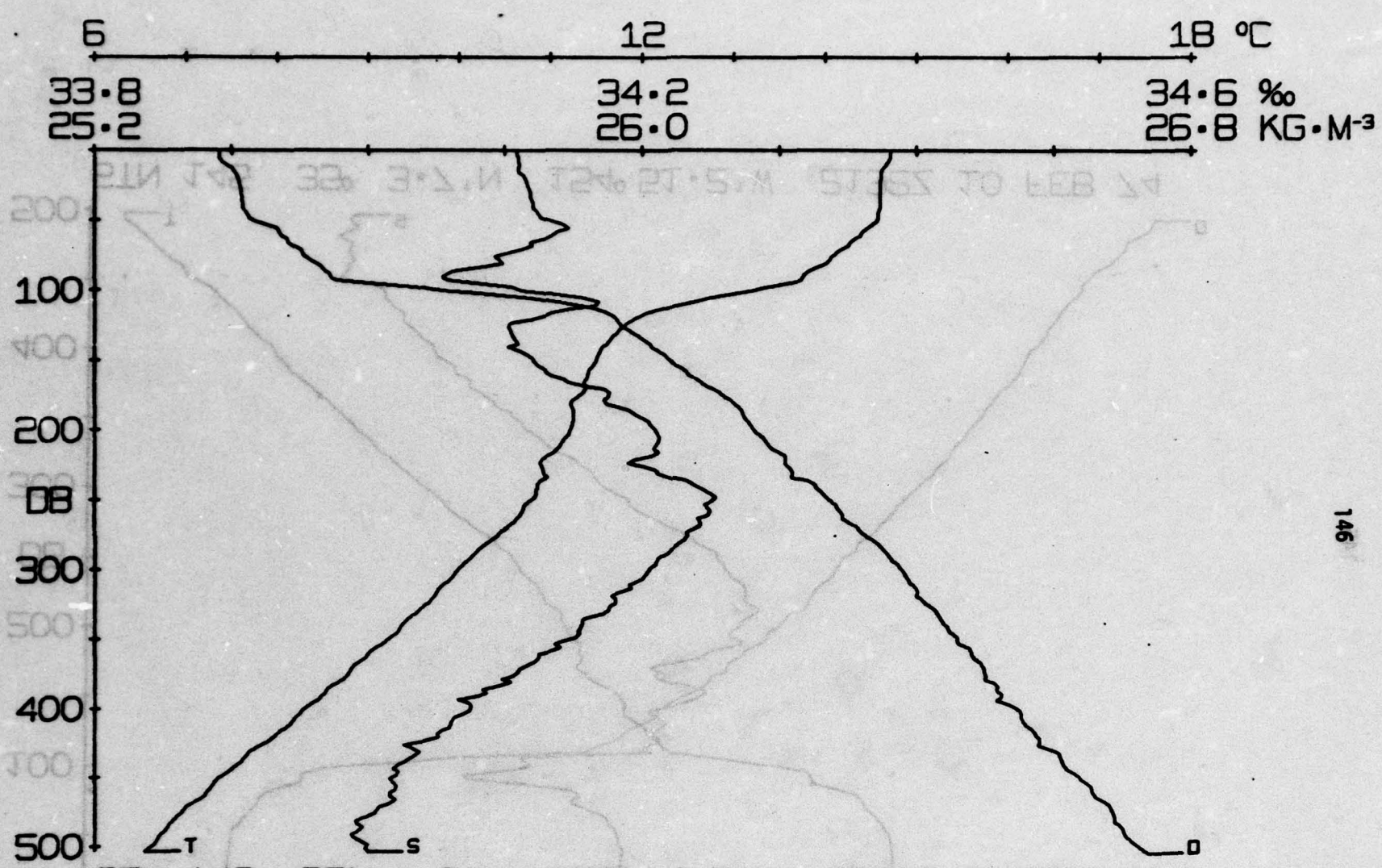
200
DB
300
400
500
T
S
O
STN 145 35° 3·7'N 154° 51·2'W 2132Z 10 FEB 74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12
18 °C
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34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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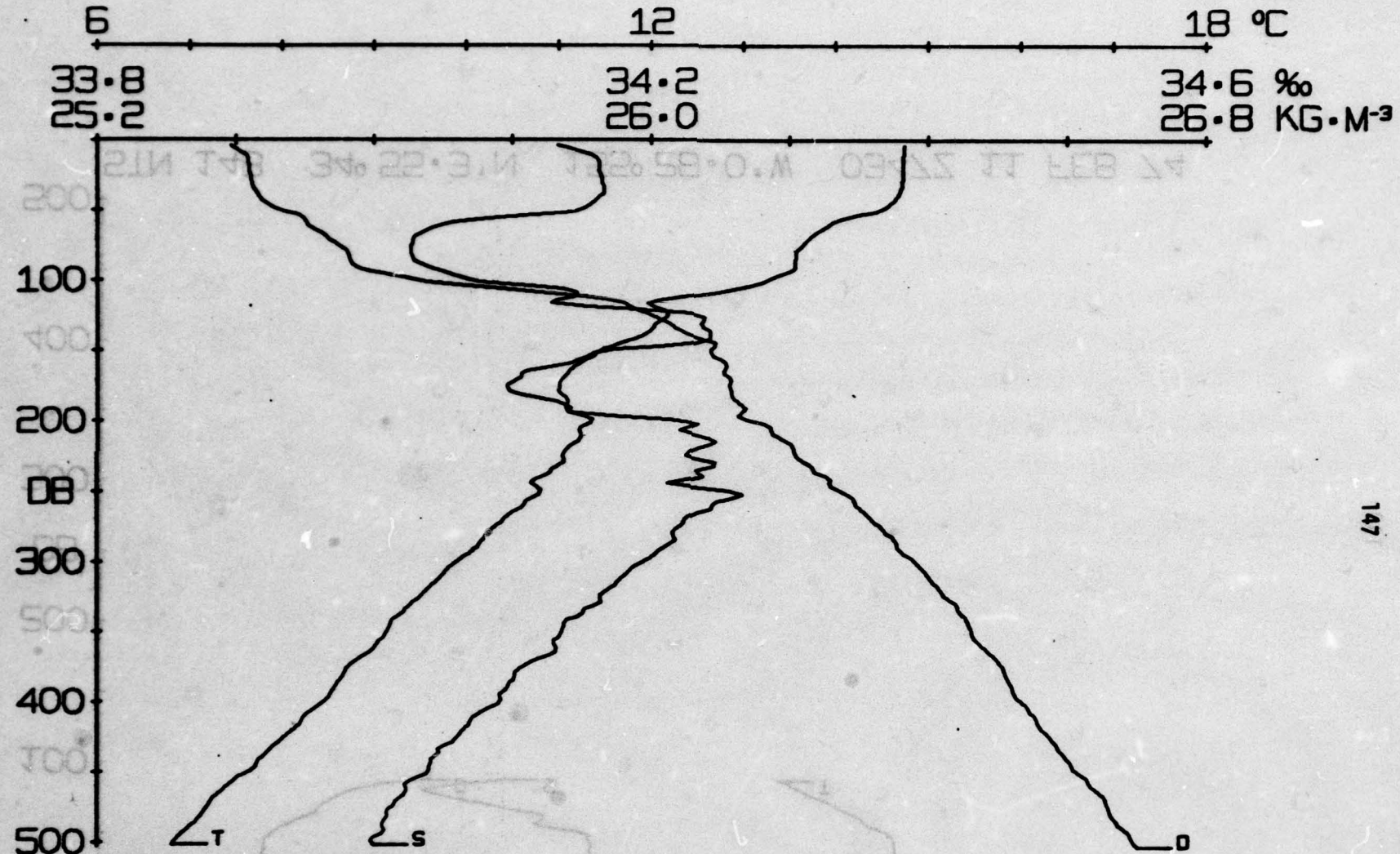
200
DB
300
400
500
T
S
D
STN 146 35° 1·0'N 155° 2·9'W 2311Z 10 FEB 74


6
12
18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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200
DB
300
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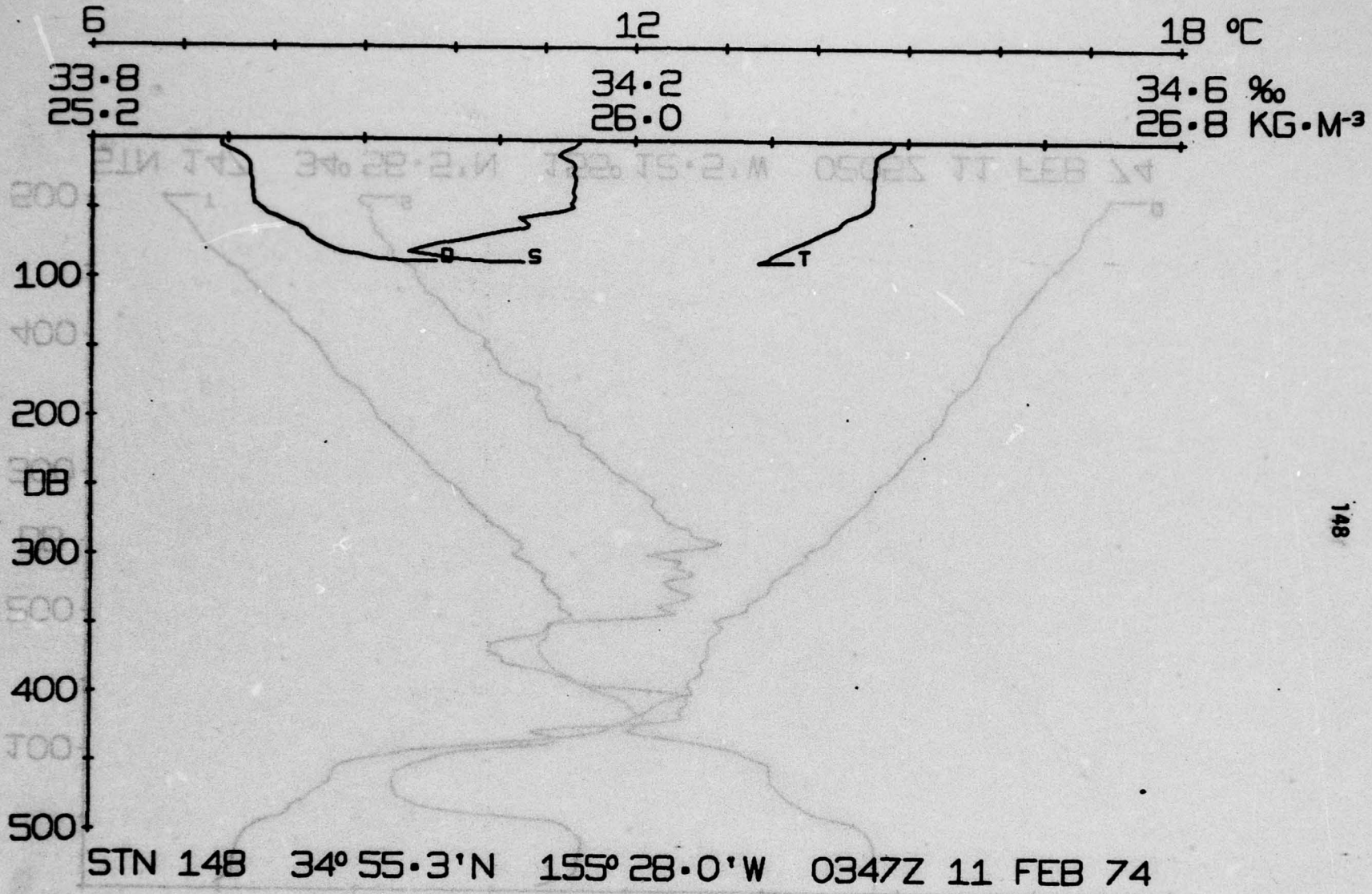
500
T
S
D
147
STN 147 34° 56·5'N 155° 12·5'W 0205Z 11 FEB 74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12
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33·8
25·2
34·2
26·0
34·6 ‰
26·8 KG·M⁻³
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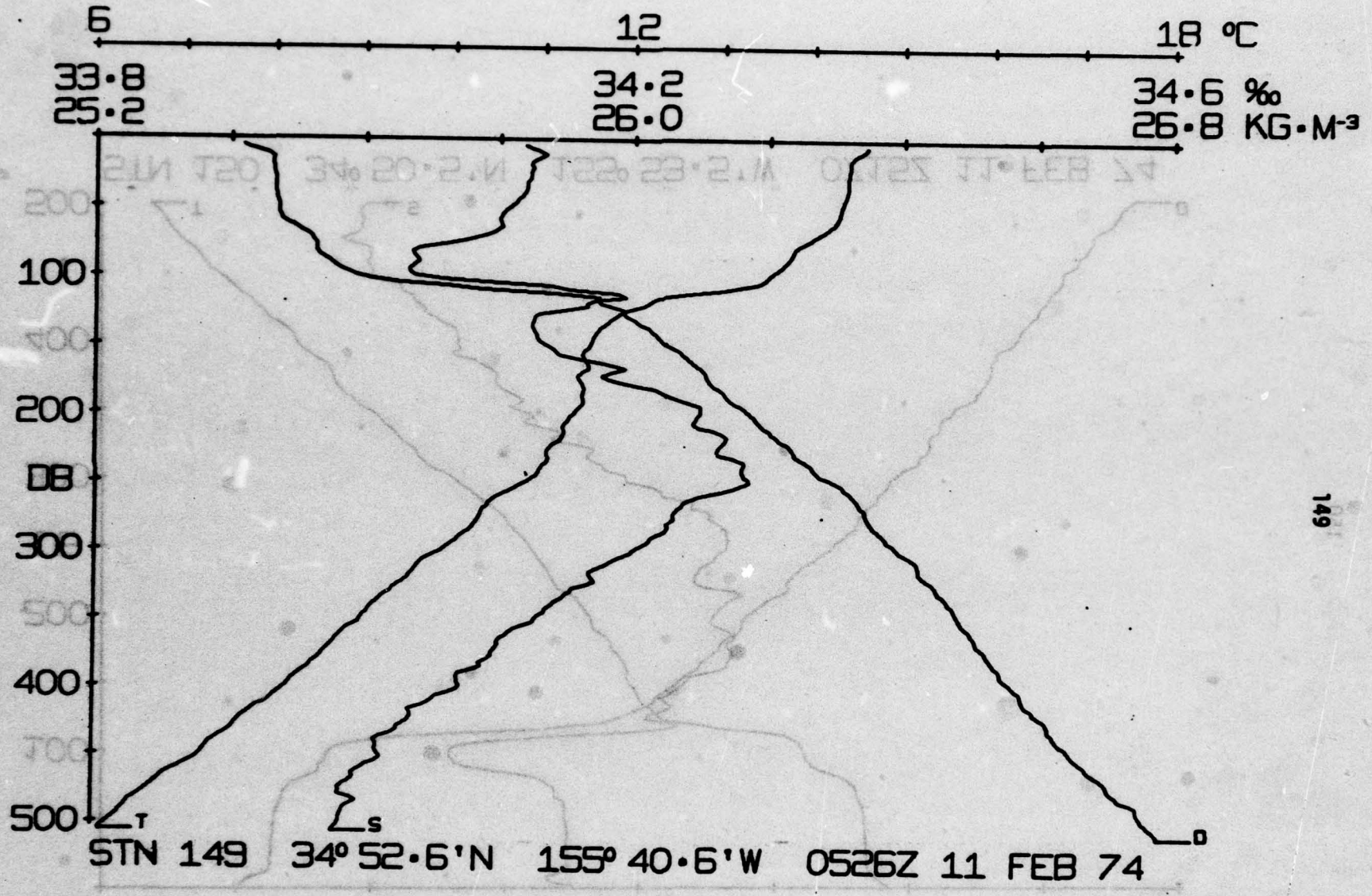
T
100
200
DB
300
400
500
148
STN 148 34° 55·3'N 155° 28·0'W 0347Z 11 FEB 74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33·8
25·2
34·2
26·0
34·6 ‰
26·8 KG·M⁻³
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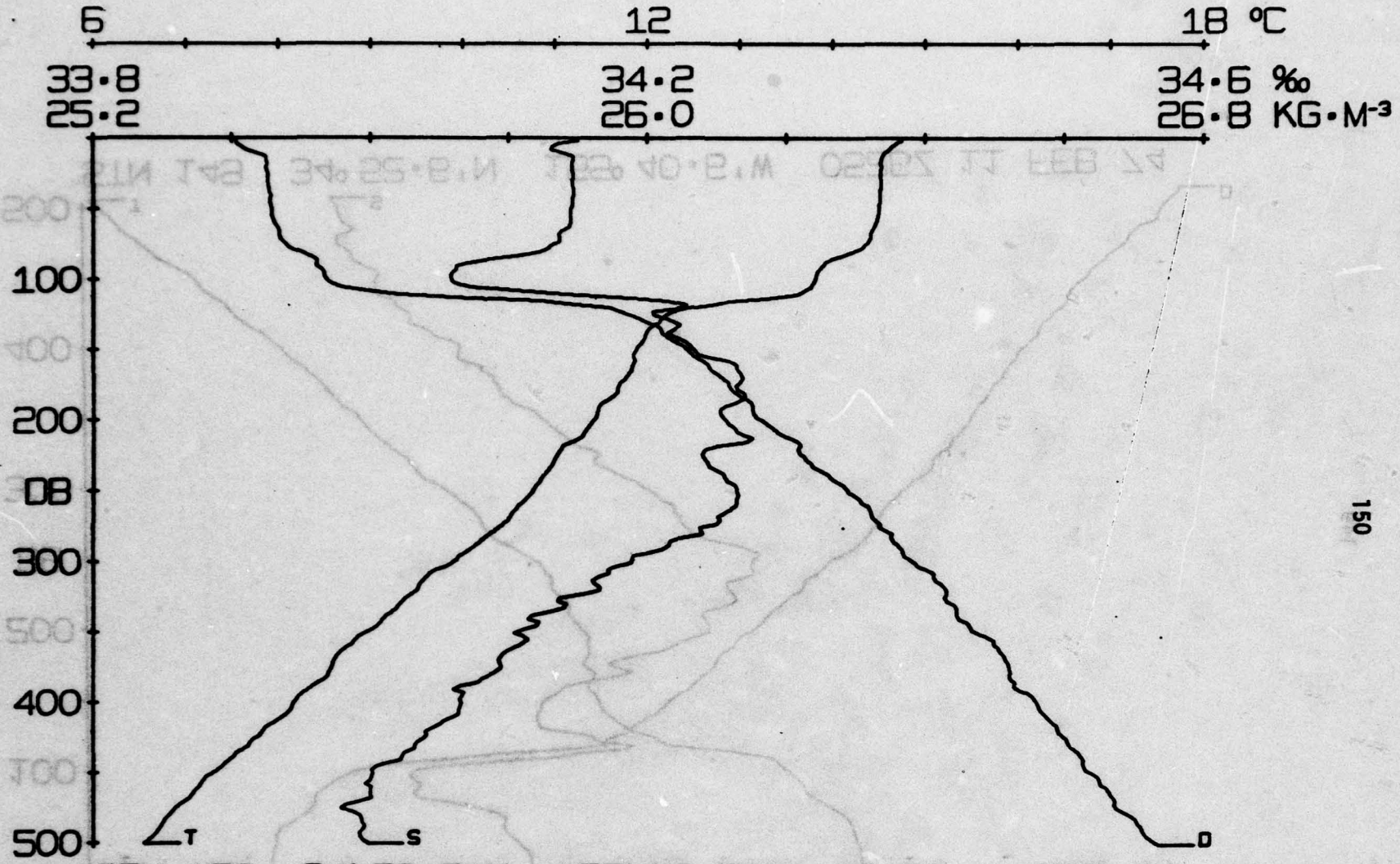
DB
300
400
500
T
S
D
149
STN 149 34° 52·6'N 155° 40·6'W 0526Z 11 FEB 74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18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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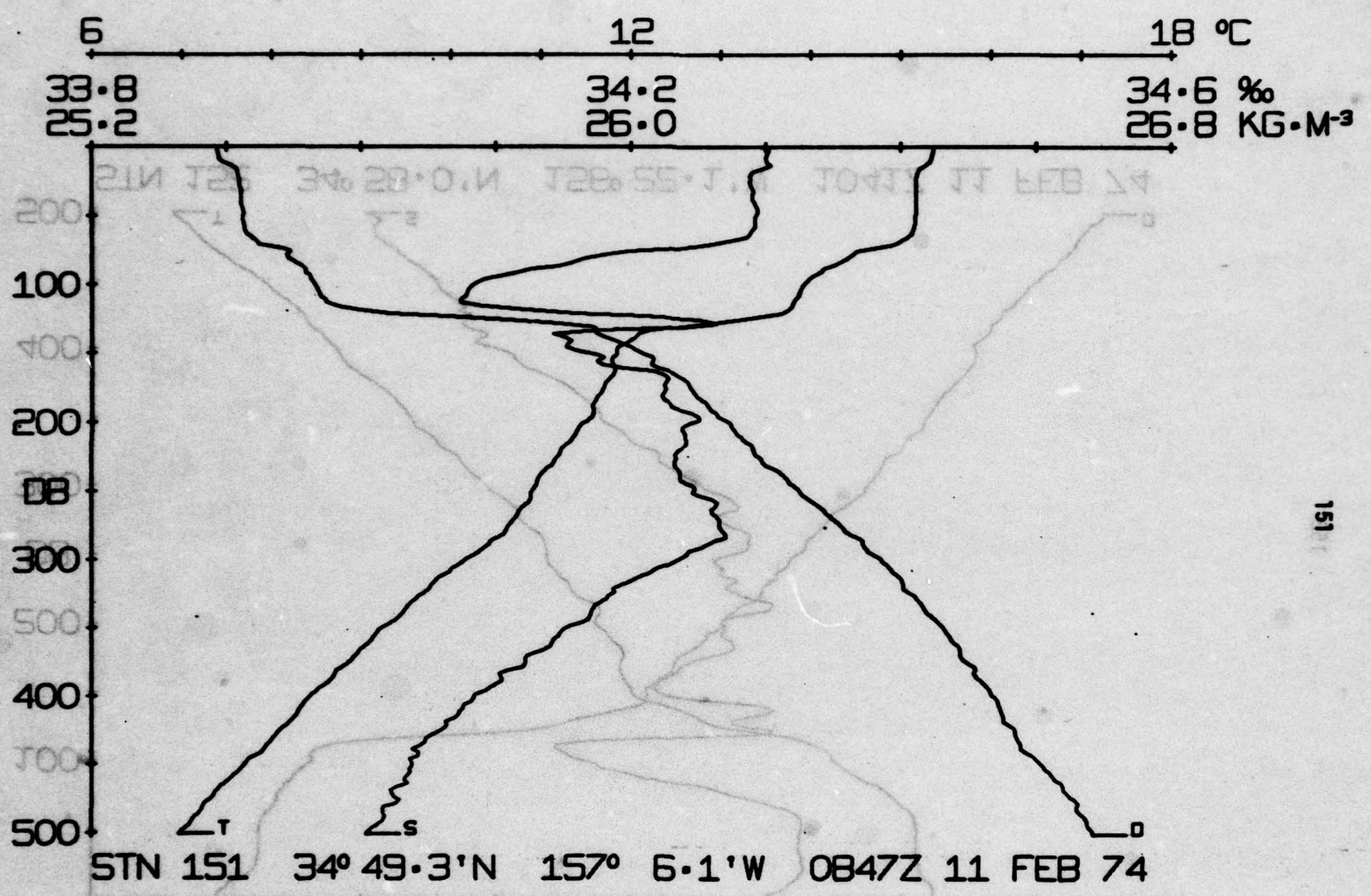
DB
300
400
500
T
S
D
150
STN 150 34° 50·5'N 155° 53·5'W 0715Z 11 FEB 74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34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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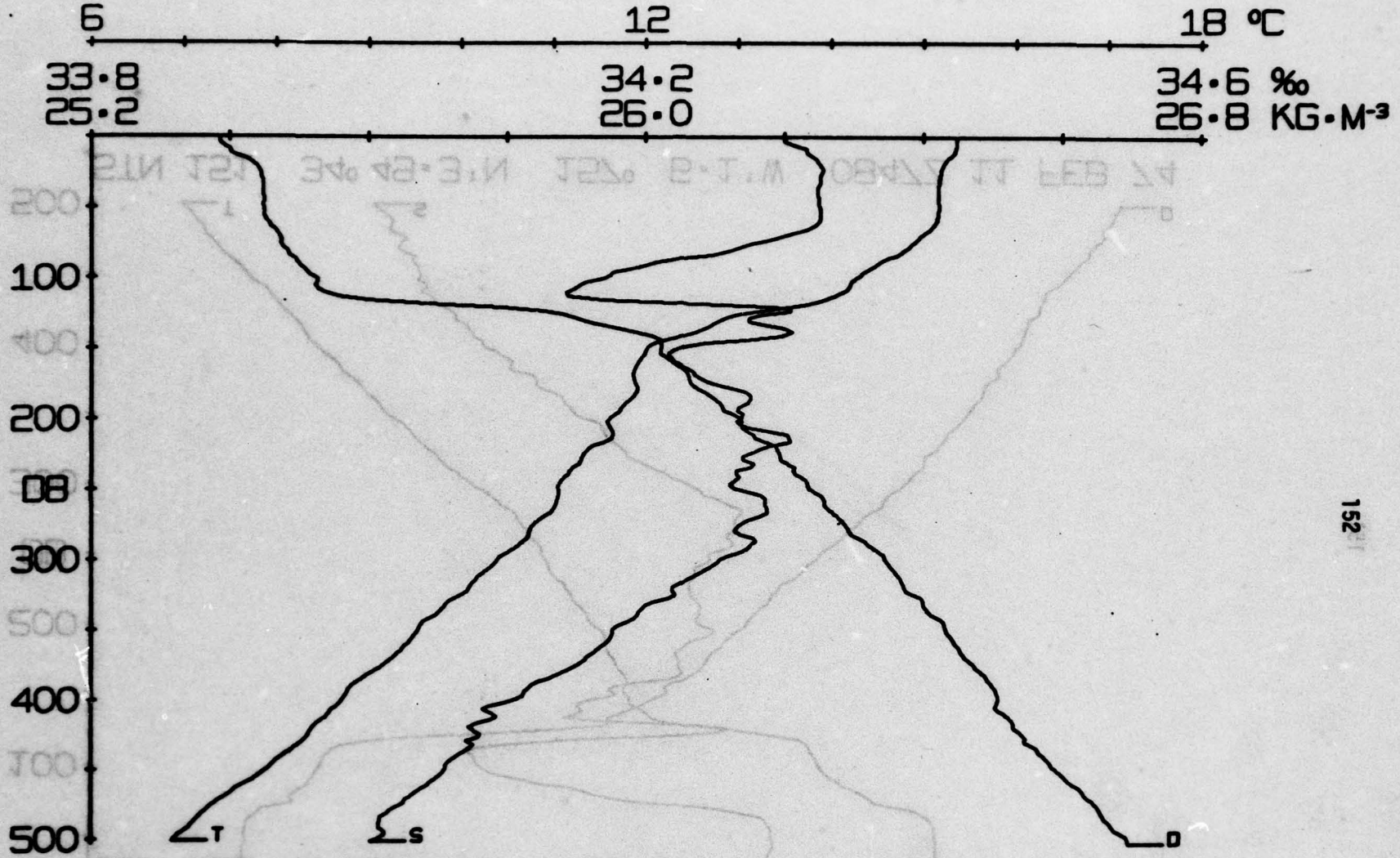
DB
300
400
500
T
S
D
STN 151 34° 49·3'N 157° 6·1'W 0847Z 11 FEB 74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33·8
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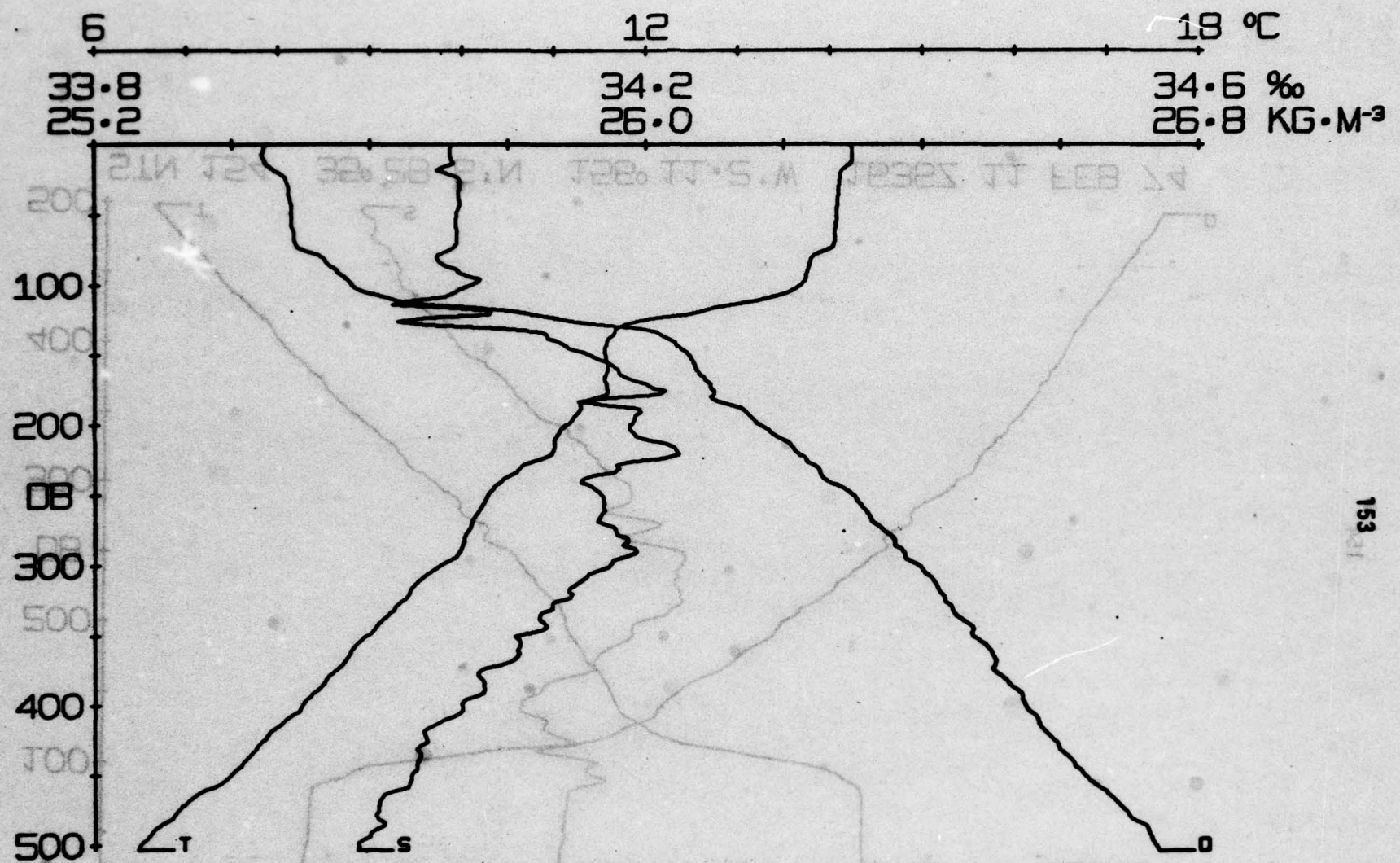
S
D
STN 152 34° 58·0'N 156° 22·1'W 1041Z 11 FEB 74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12
18 °C
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26·0
26·8 KG·M⁻³
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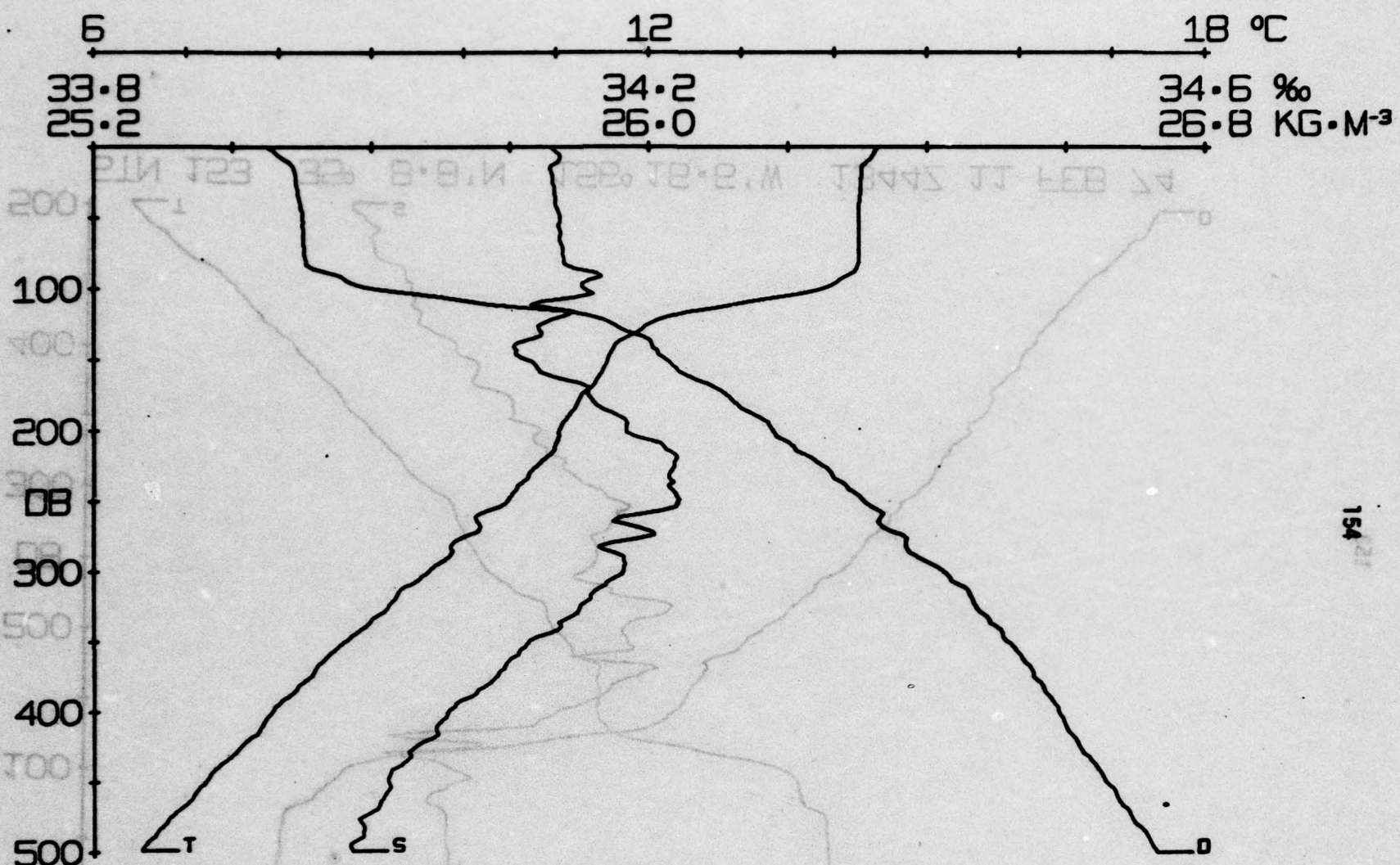
153
STN 153 35° 8·8'N 156° 16·6'W 1344Z 11 FEB 74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34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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S
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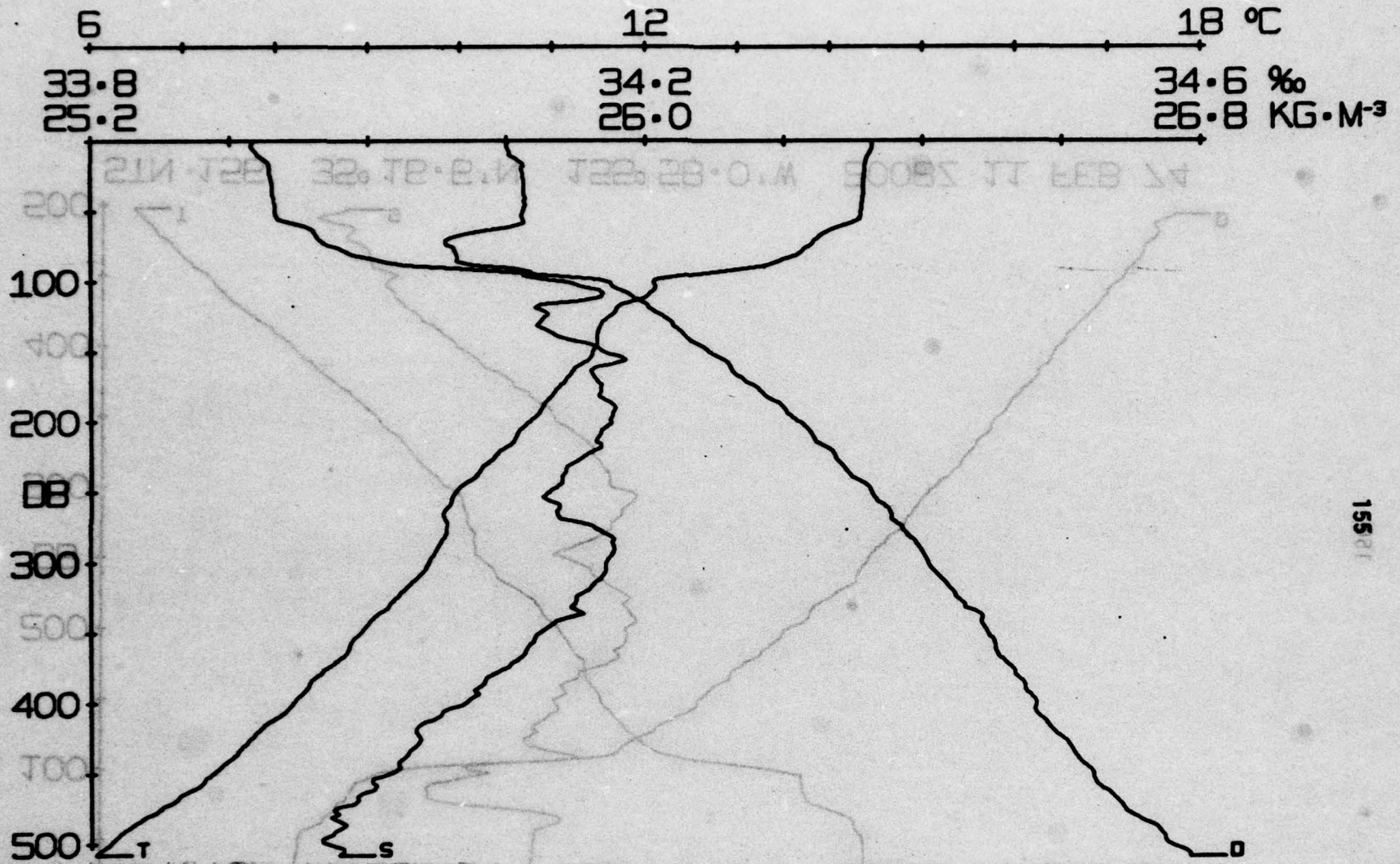
154
STN 154 35° 28·6'N 156° 11·2'W 1636Z 11 FEB 74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34·2
34·6 ‰
25·2
26·0
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300
400
500
T
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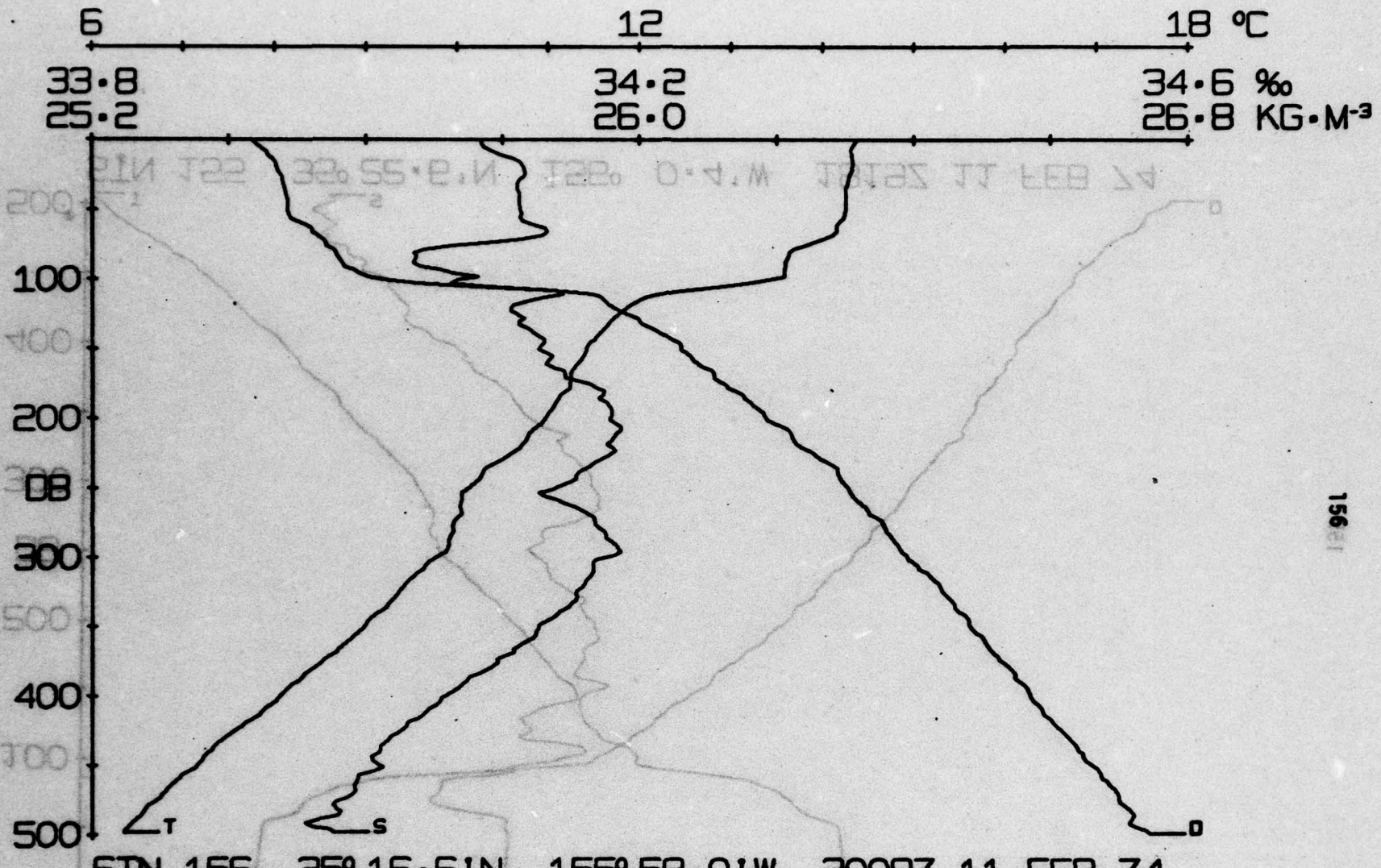
D
STN 155 35° 22·6'N 156° 0·4'W 1819Z 11 FEB 74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18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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DB
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400
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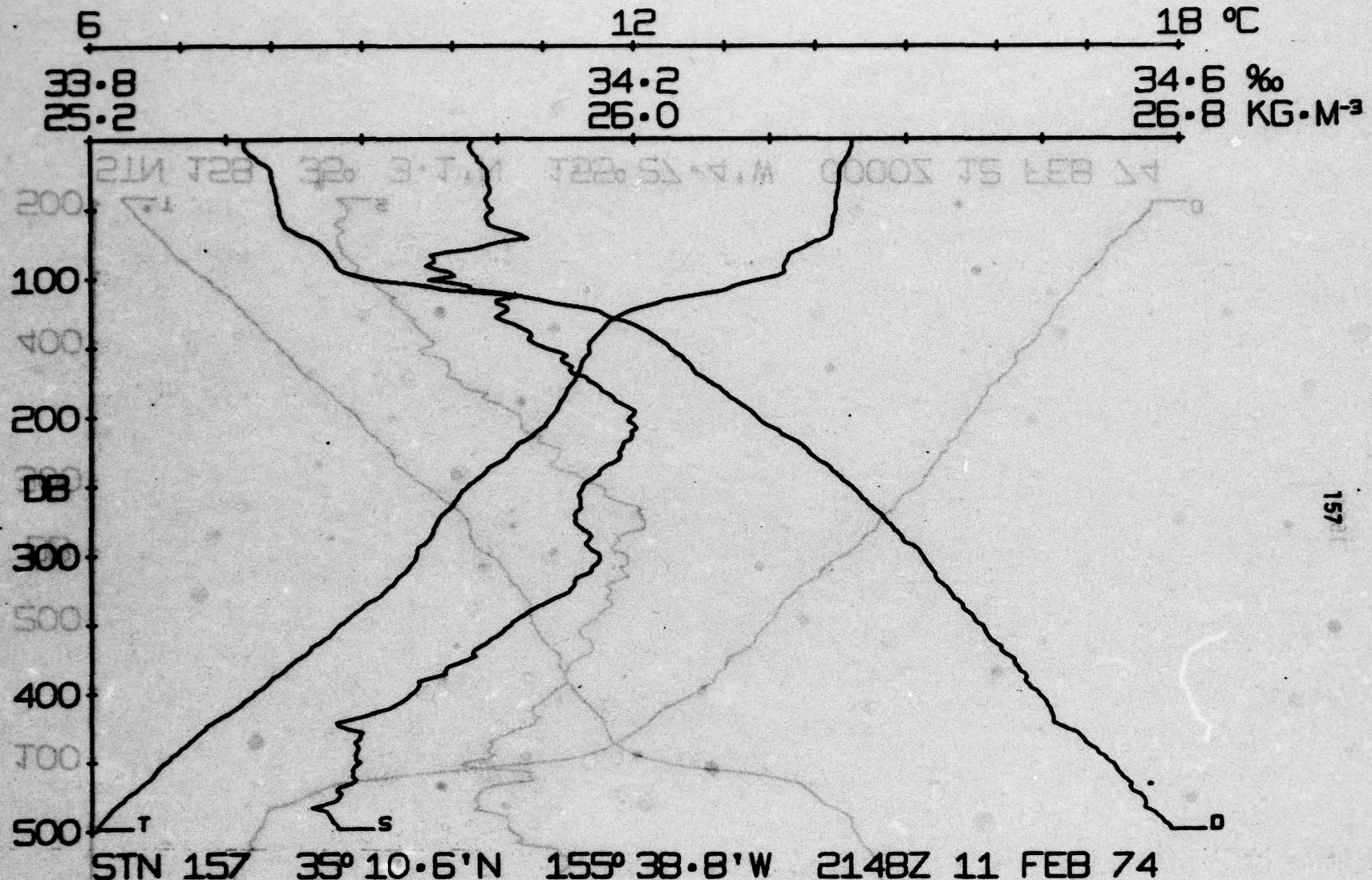
T
S
D
STN 156 35° 16·6'N 155° 58·0'W 2008Z 11 FEB 74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34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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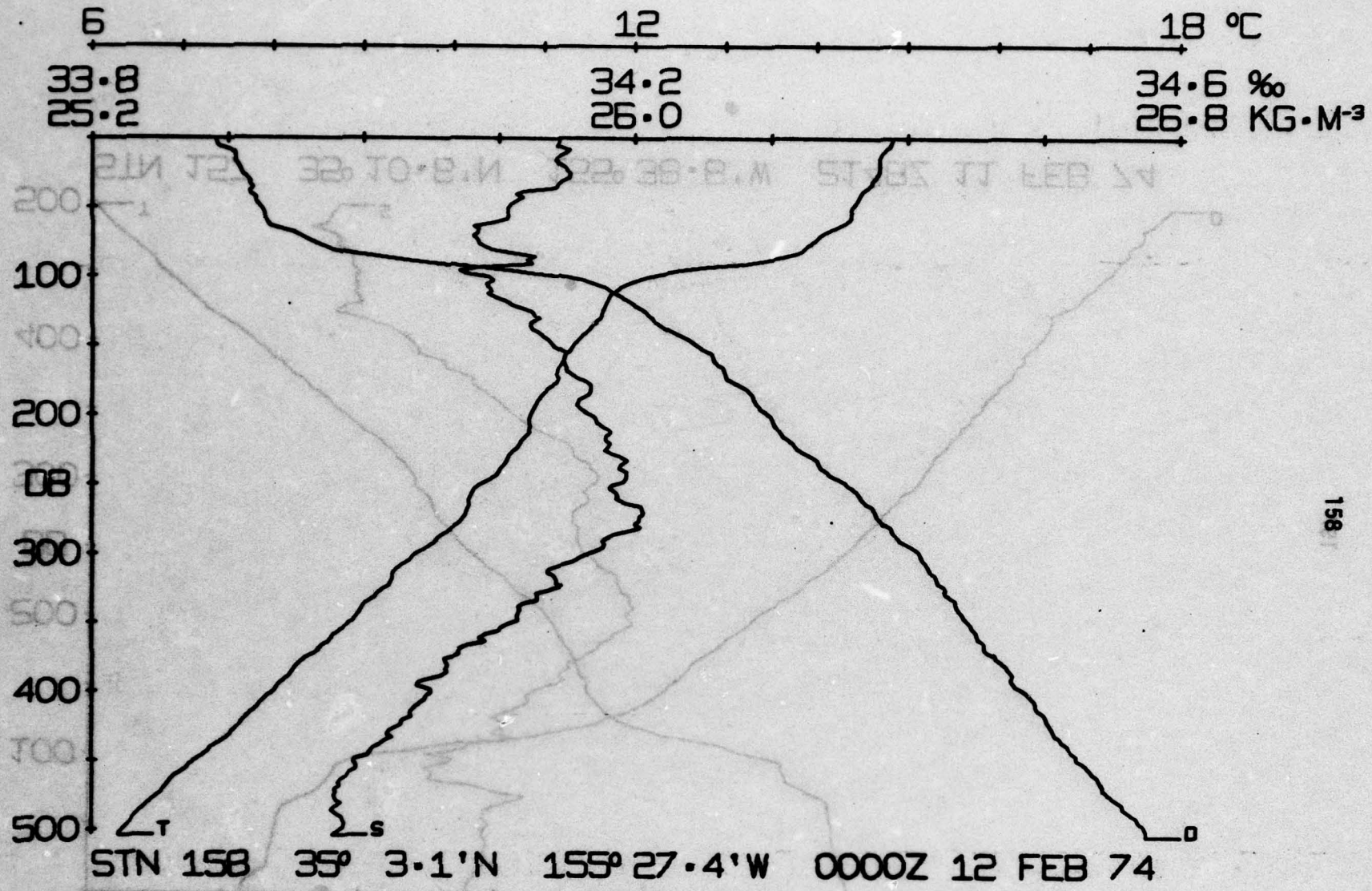
DB
300
400
500
T
S
D
157
STN 157 35° 10·6'N 155° 38·8'W 2148Z 11 FEB 74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34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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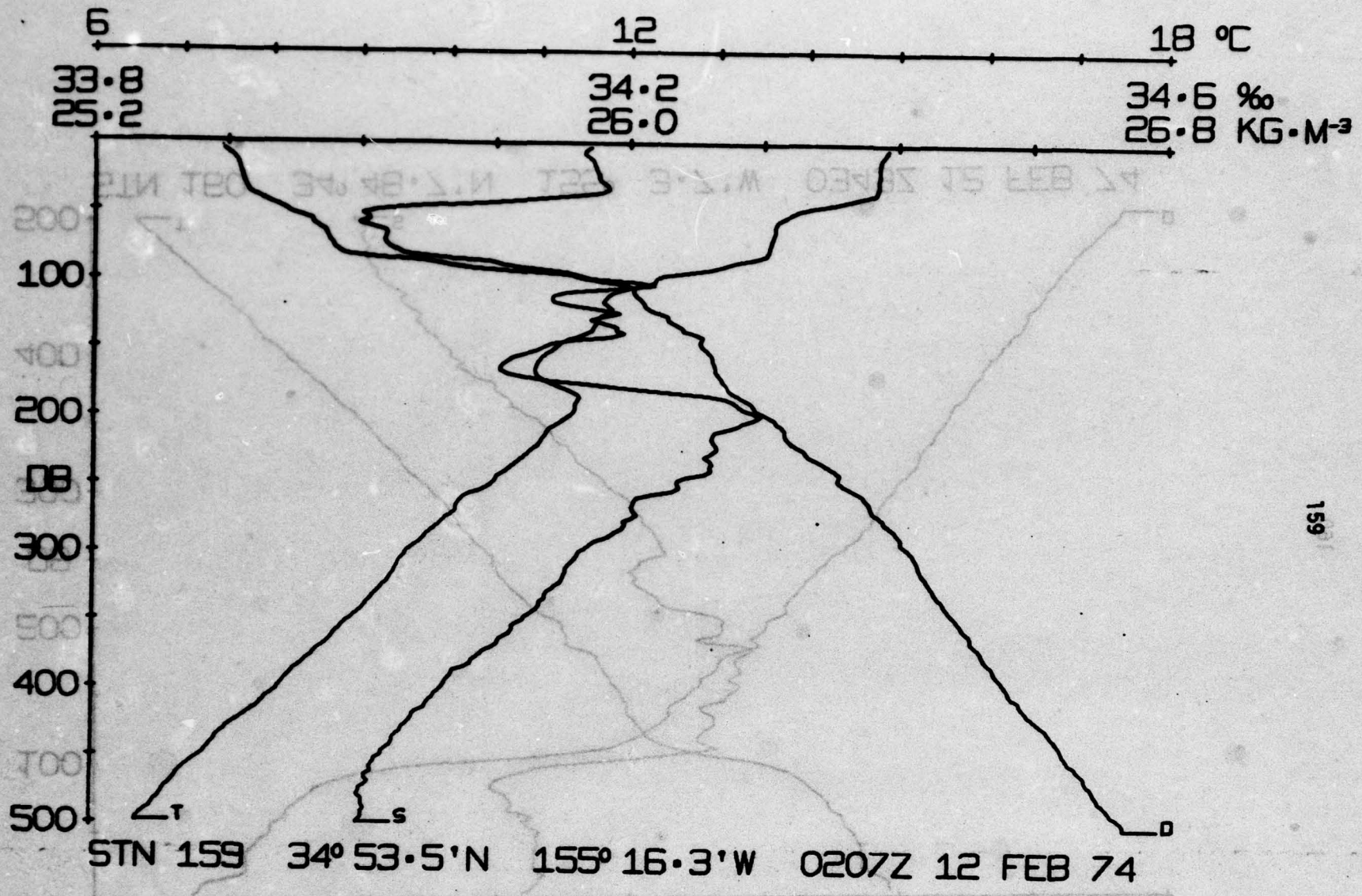
200
300
400
500
T
S
D
158
STN 158 35° 3·1'N 155° 27·4'W 0000Z 12 FEB 74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12
18 °C
33·8
25·2
34·2
26·0
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26·8 KG·M⁻³
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S
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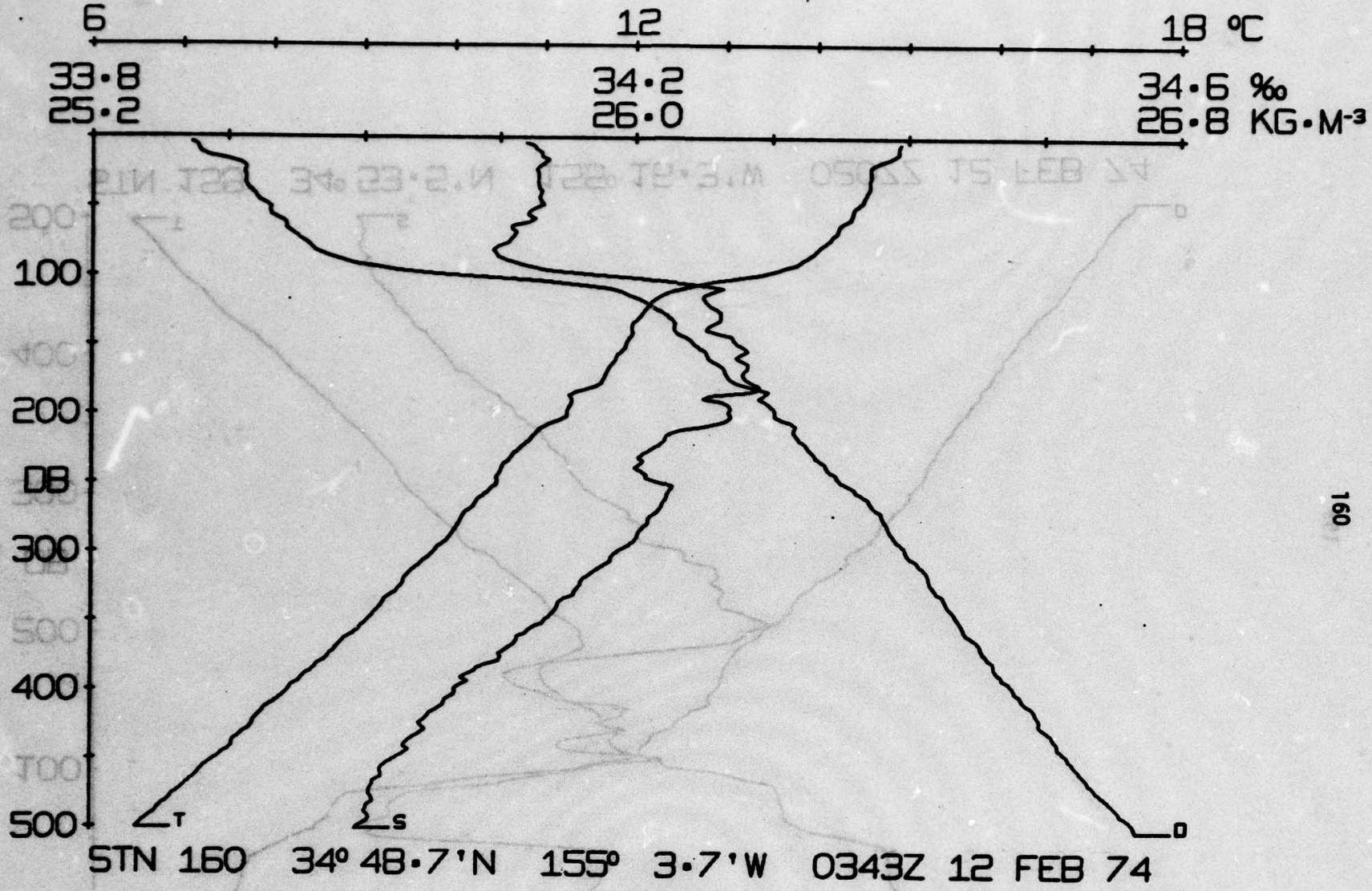
159
STN 159 34° 53·5'N 155° 16·3'W 0207Z 12 FEB 74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12
18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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DB
300
400
500
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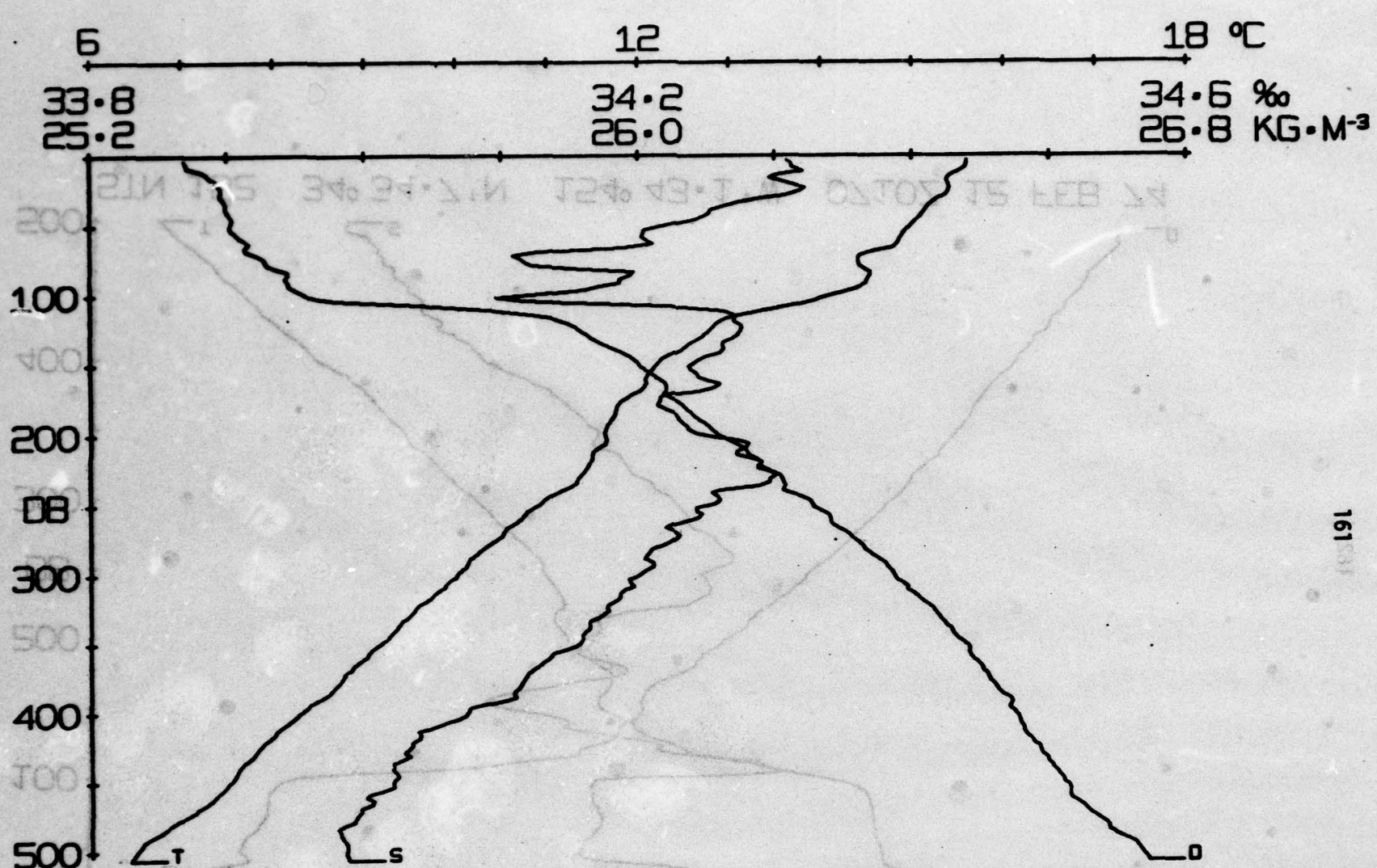
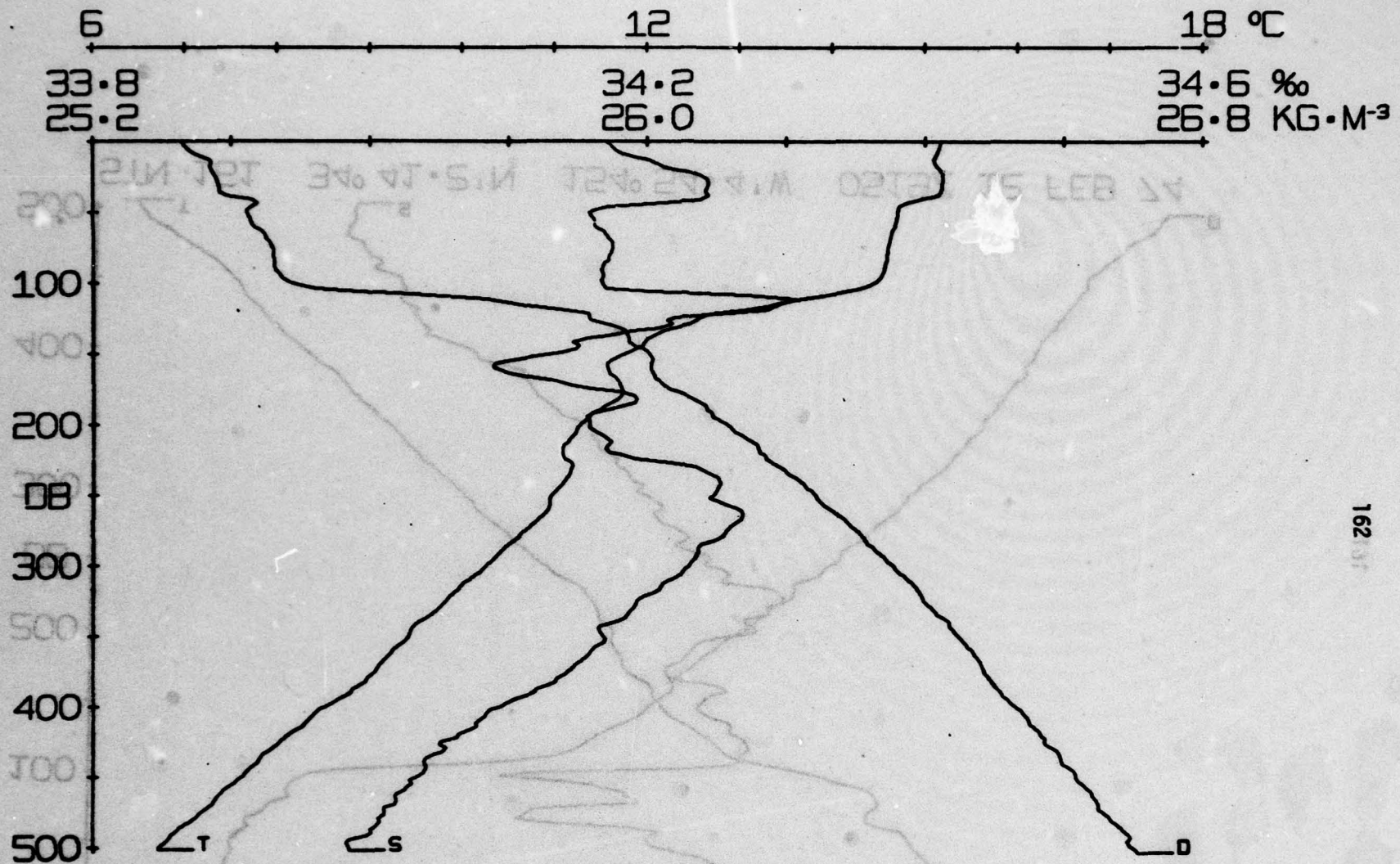
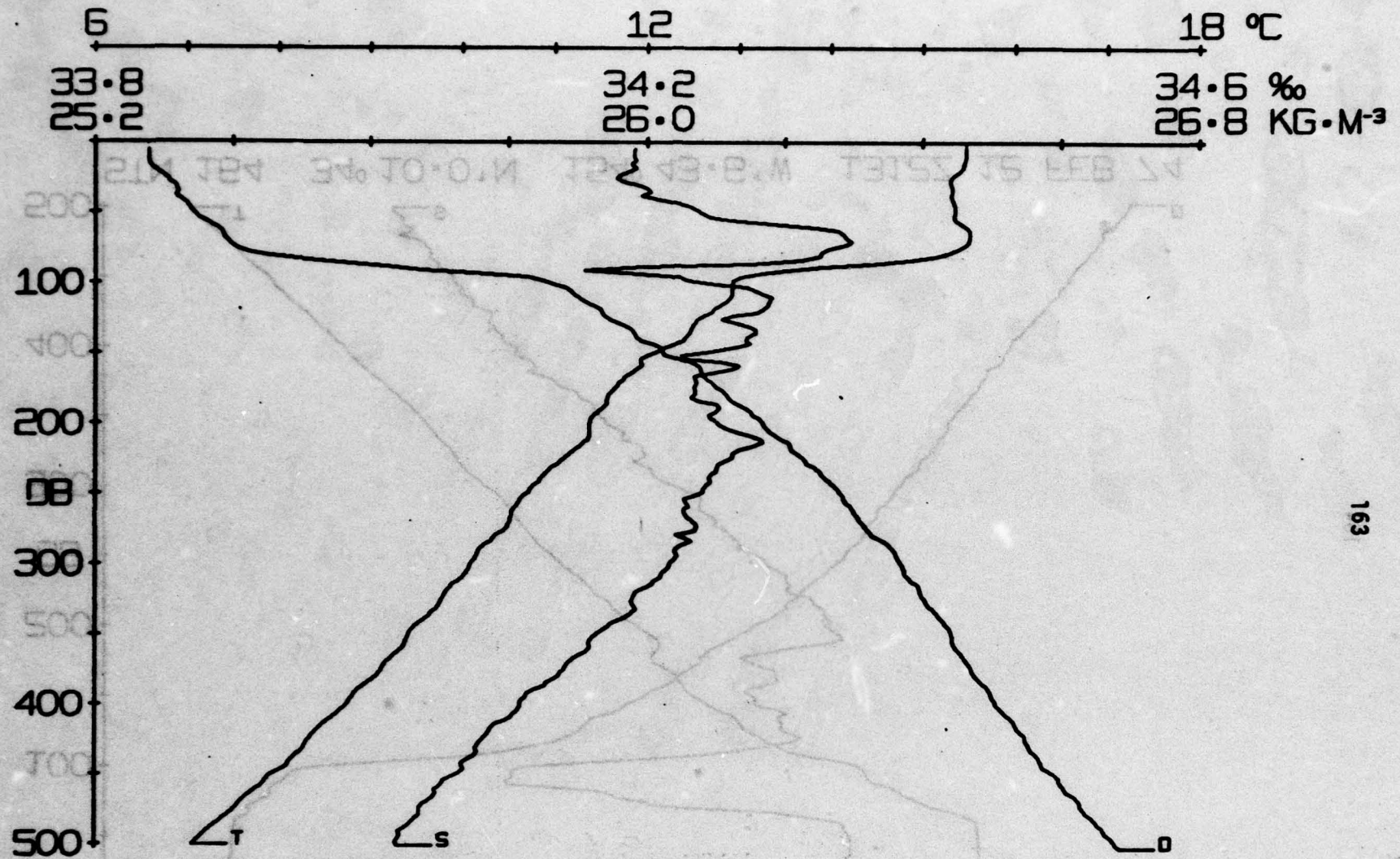
S
O
160
STN 160 34° 48·7'N 155° 3·7'W 0343Z 12 FEB 74



STN 161 34° 41·2'N 154° 54·4'W 0519Z 12 FEB 74



STN 162 34° 34·7'N 154° 43·1'W 0710Z 12 FEB 74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12
18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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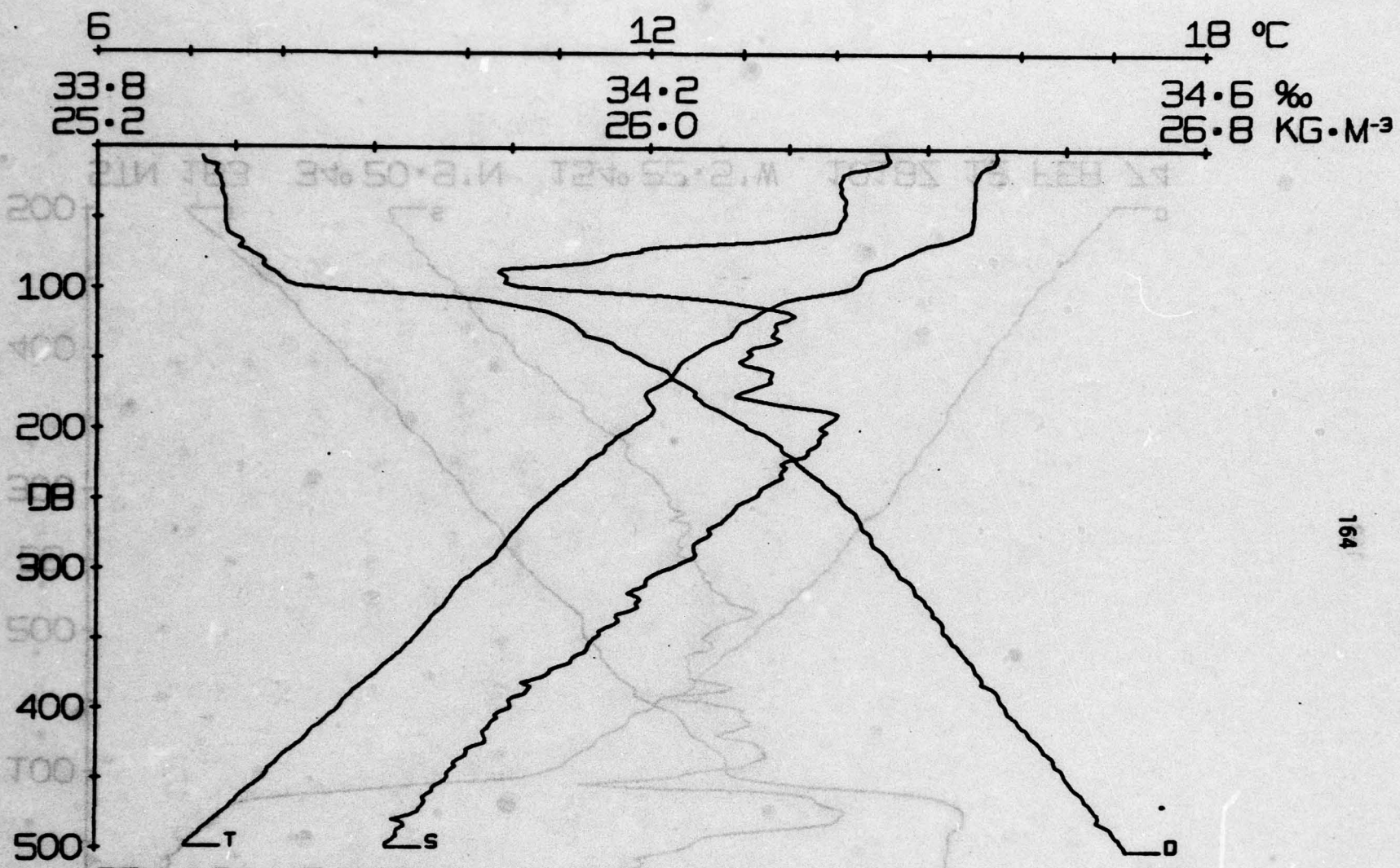
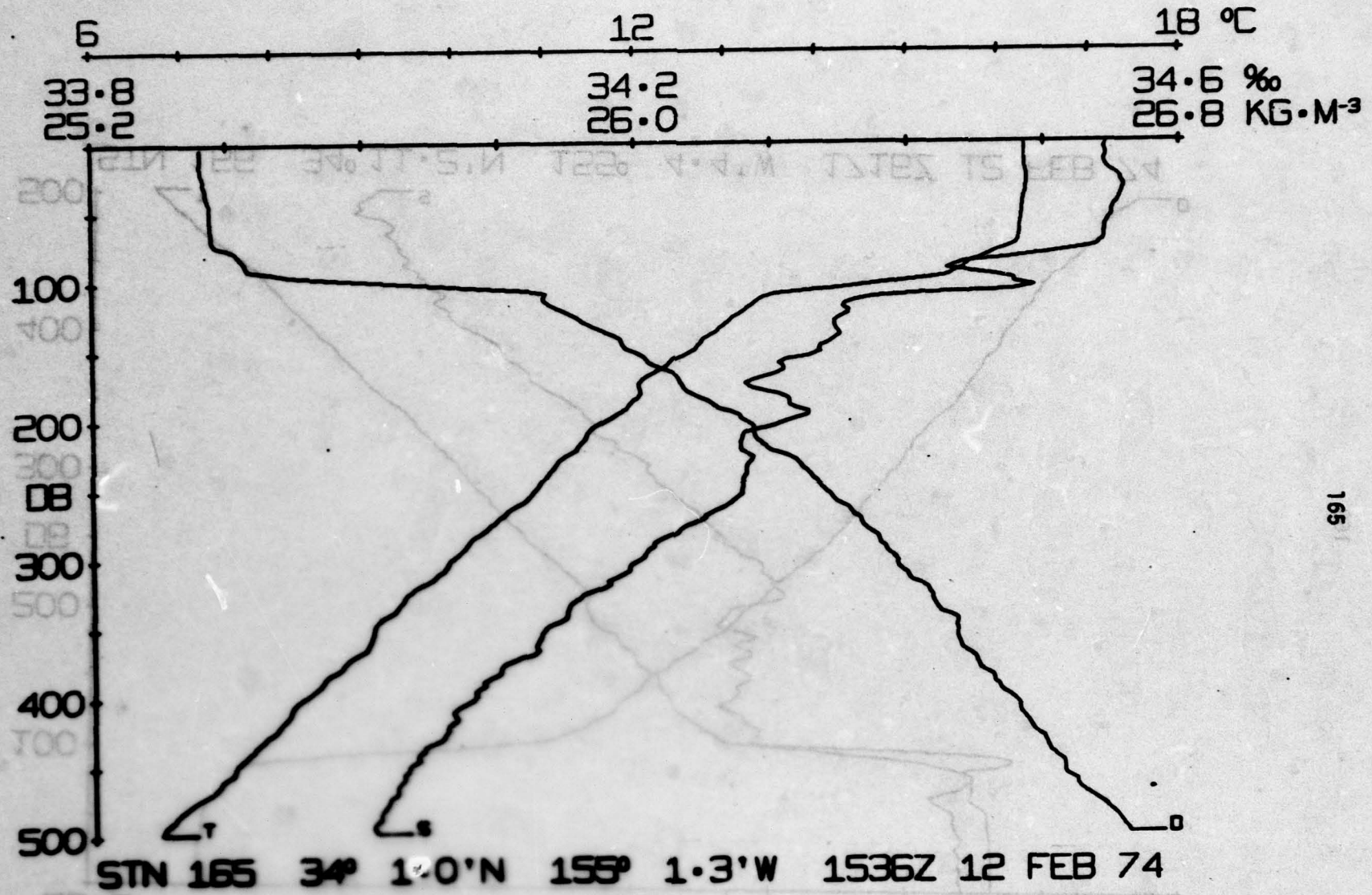
DB
300
400
500
T
S
D
163
STN 163 34° 20·9'N 154° 22·5'W 1018Z 12 FEB 74



STN 164 34° 10·0'N 154° 43·6'W 1312Z 12 FEB 74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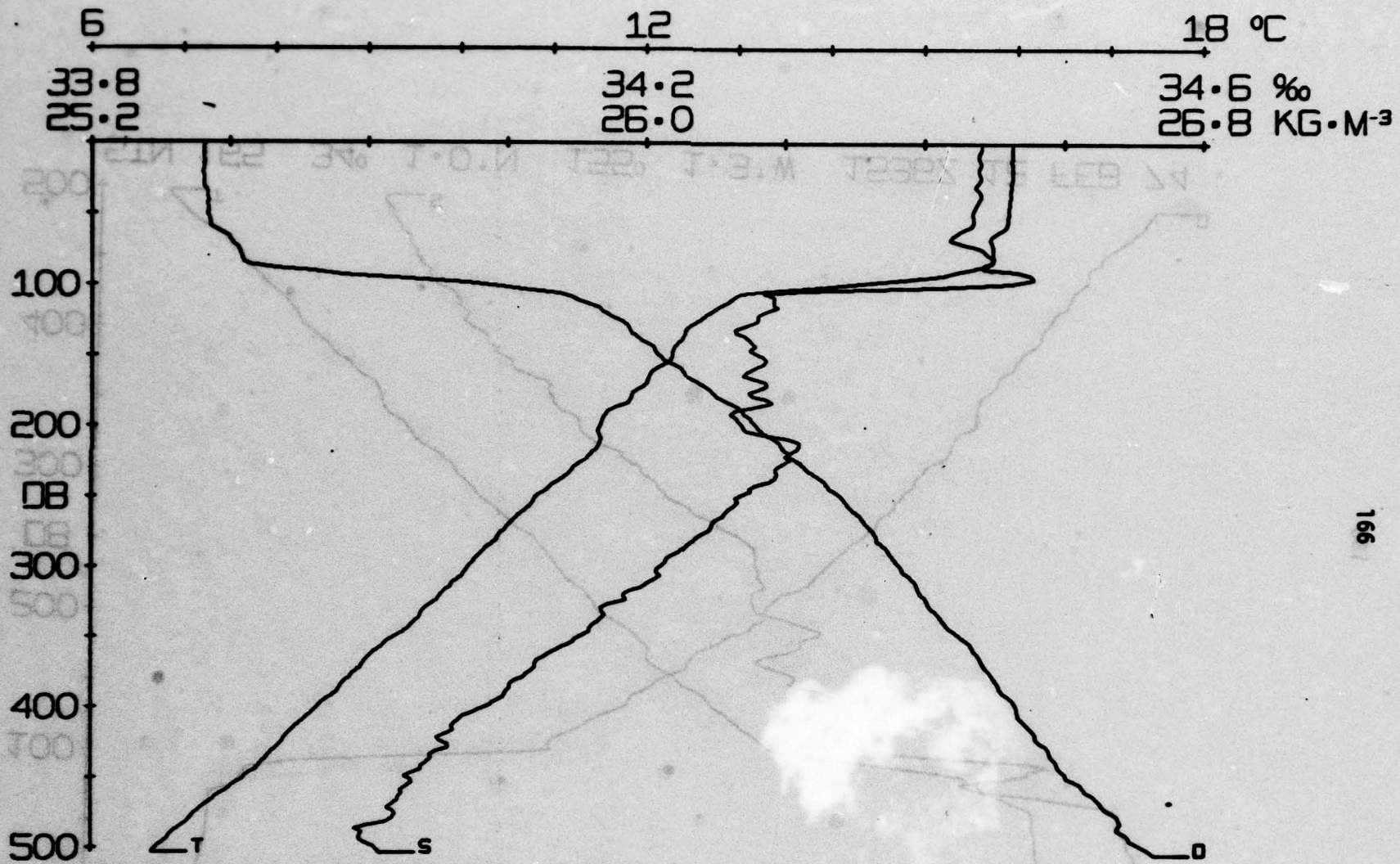
12
18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
100
200
DB
300
400
500
T
S
D
165
STN 165 34° 1·0'N 158° 1·3'W 1536Z 12 FEB 74


6
12
18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M⁻³
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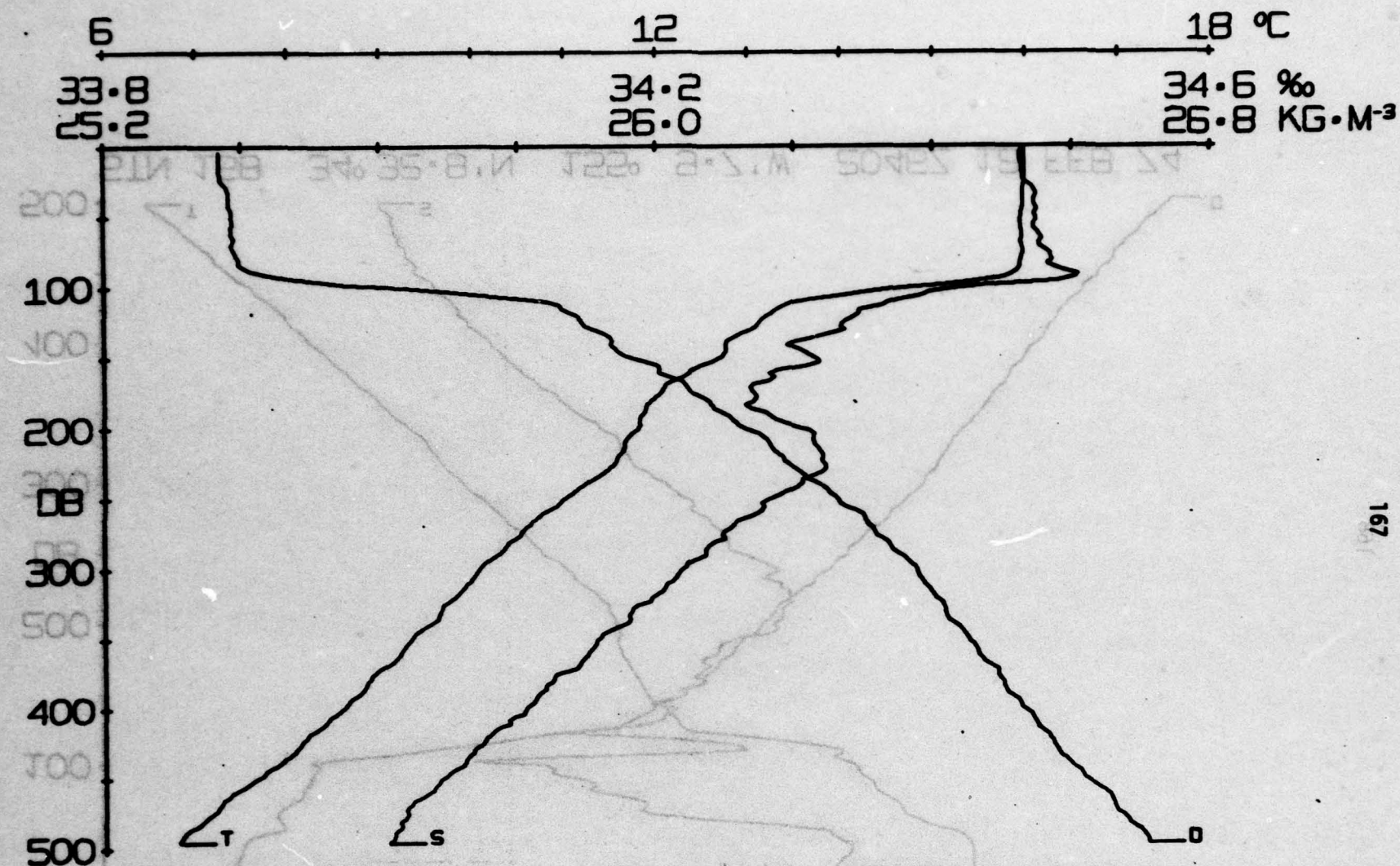
200
DB
300
400
500
T
S
D
STN 166 34° 11·2'N 155° 4·4'W 1716Z 12 FEB 74


6
12
18 °C
33·8
34·2
34·6 ‰
25·2
26·0
26·8 KG·M-3
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200
DB
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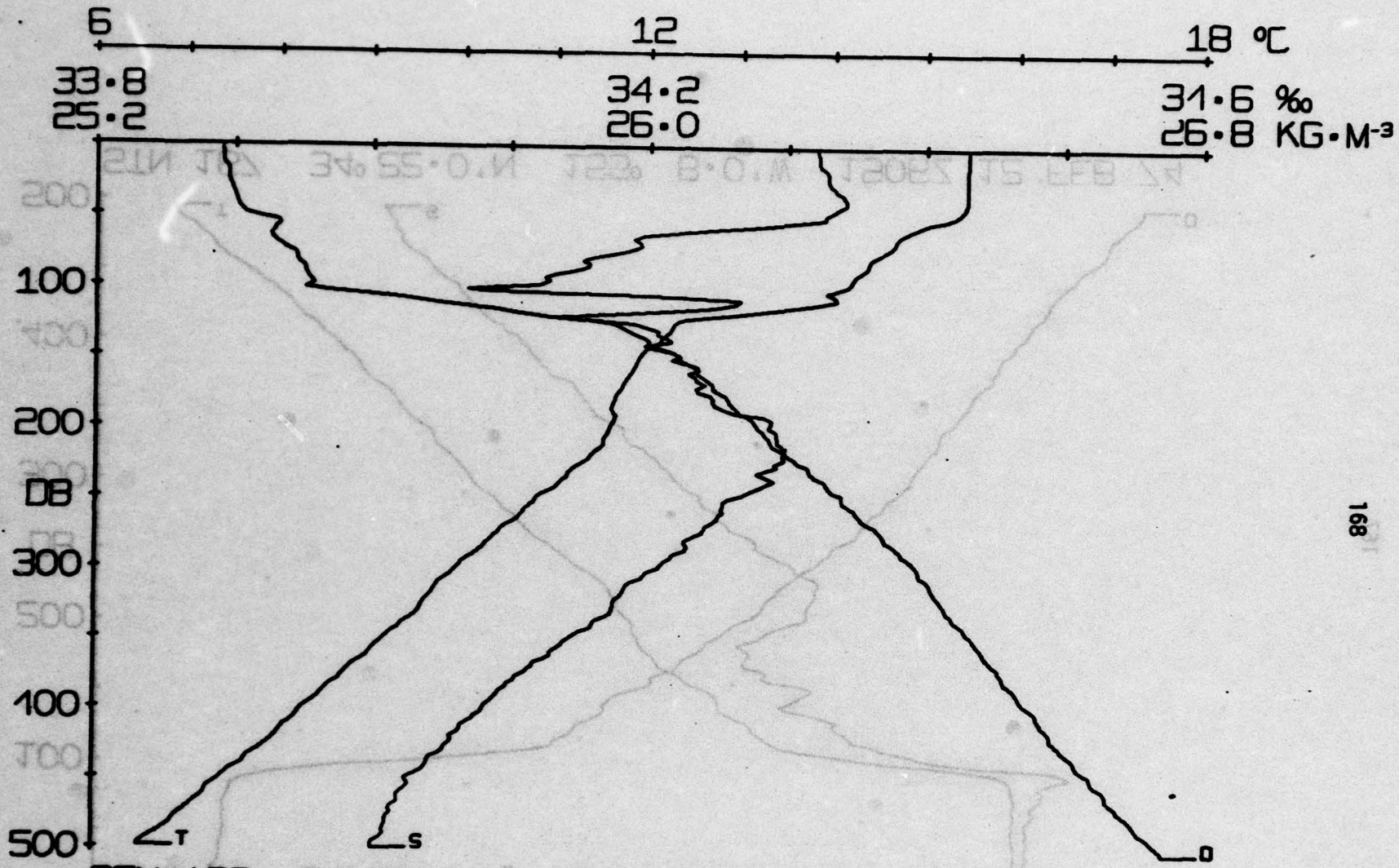
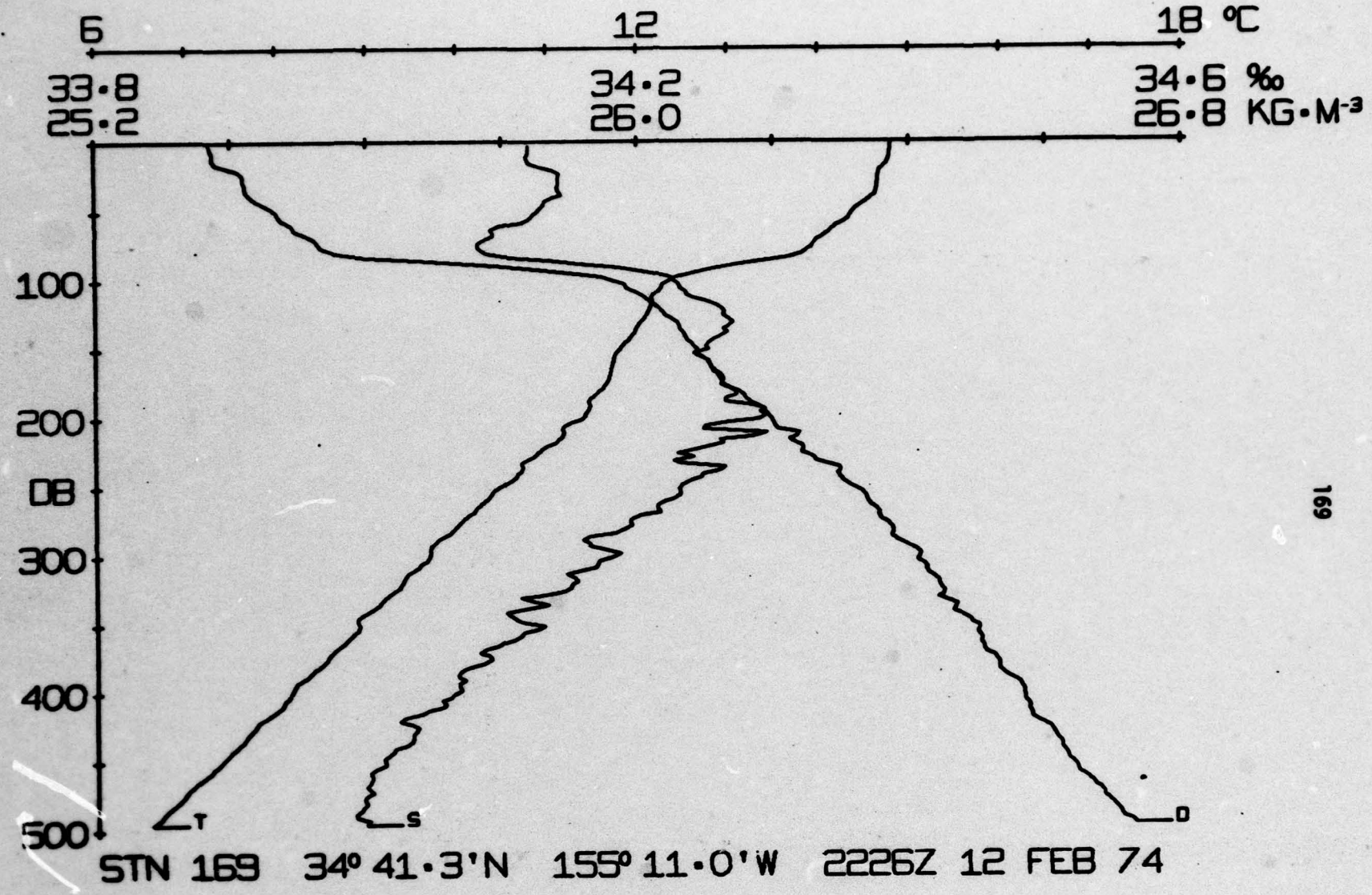
400
500
T
S
D
STN 167 34° 22·0'N 155° 8·0'W 1906Z 12 FEB 74


6
12
18 °C
33·8
25·2
34·2
26·0
31·6 ‰
26·8 KG·M⁻³
100
200
DB
300
100
500
T
S
D
168
STN 168 34° 32·8'N 155° 9·7'W 2046Z 12 FEB 74



STN 169 34° 41·3'N 155° 11·0'W 2226Z 12 FEB 74